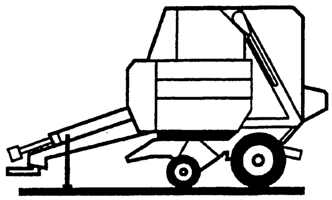
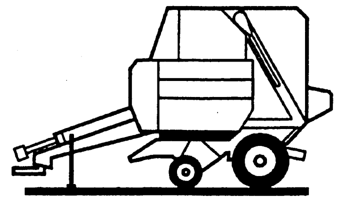
Please cut where indicated and insert the label into the plastic pocket on the spine of the binder.



ROUND BALER REPAIR

634, 644, 654, 664

40063440



ROUND BALER REPAIR

634, 644, 654, 664

40063440

ROUND BALER SERVICE MANUAL CONTENTS

SECTION 1

GENERAL INFORMATION

INTRODUCTION

This service manual provides the technical information needed to properly service New Holland Roll-Belt™ round balers. Use this manual in conjunction with the operator's manual for complete operation, adjustment, and maintenance information.

On New Holland equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

The descriptions and specifications contained in this manual were in effect at the time the book was released for printing. New Holland North America, Inc. reserves the right to discontinue models at any time, or to change specifications and design without notice, and without incurring obligation.

NOTE: Some photographs in this manual were taken of prototype or previous production models. Current production models may vary in some detail.

PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements ("CAUTION", "WARNING", and "DANGER") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

CAUTION: THE WORD "CAUTION" IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.

WARNING: THE WORD "WARNING" DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.

DANGER: THE WORD "DANGER" DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

FAILURE TO FOLLOW THE "CAUTION", "WARNING", AND "DANGER" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

MACHINE SAFETY

Additional precautionary statements ("ATTENTION" and "IMPORTANT") are followed by specific instructions. These statements are intended for machine safety.

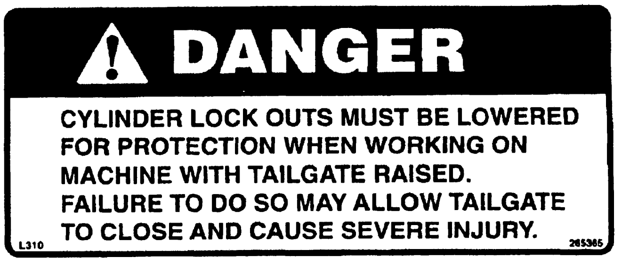
ATTENTION: The word "ATTENTION" is used to warn the operator of potential machine damage if a certain procedure is not followed.

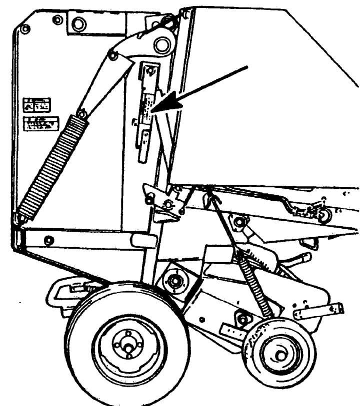
IMPORTANT: The word "IMPORTANT" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.

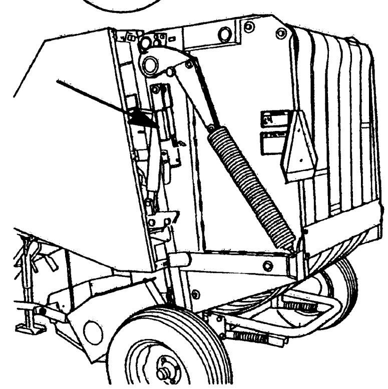
SAFETY DECALS - Model 634

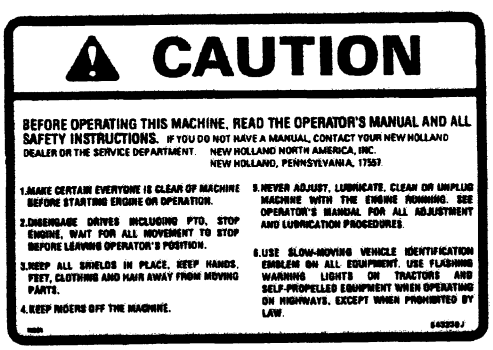
The following safety decals have been placed on your machine in the areas indicated. They are intended for the personal safety of you, and those working with you. Please take this manual walk around your machine and note the content and location of these warning signs. Review these decals and the operating instructions in this manual with your machine operators.

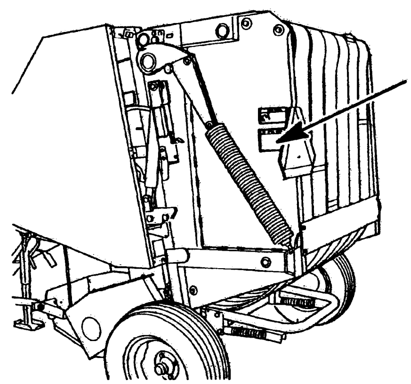
Keep the decals legible. If they are not, obtain replacements from your New Holland dealer.



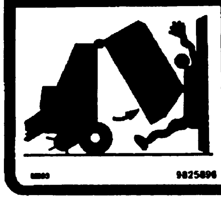








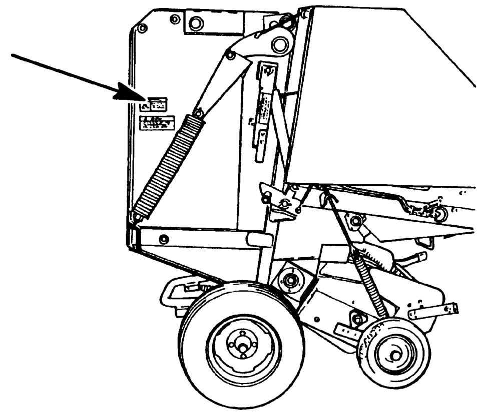
⚠ DANGER

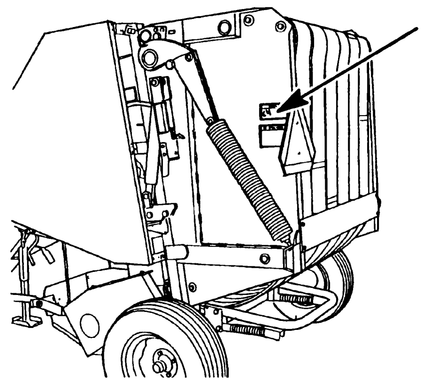


STAND CLEAR OF SIDES AND REAR OF THIS MACHINE

TAILGATE OPENS FASTER THAN YOU CAN MOVE AWAY.

FAILURE TO DO SO MAY RESULT IN DEATH OR SERIOUS INJURY.





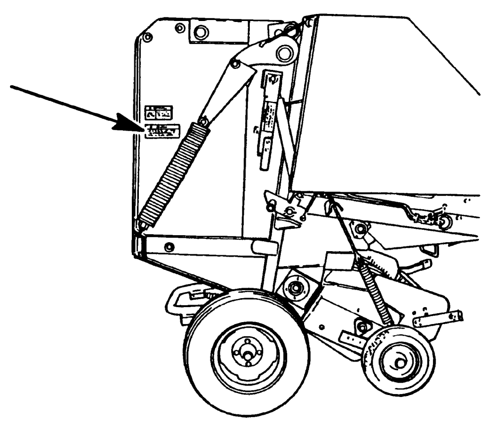
⚠ WARNING

BALES MADE WITH THIS BALER ARE HEAVY, LARGE AND ROUND. PROPERTY DAMAGE OR INJURY COULD RESULT IF THEY ARE NOT HANDLED CAREFULLY!

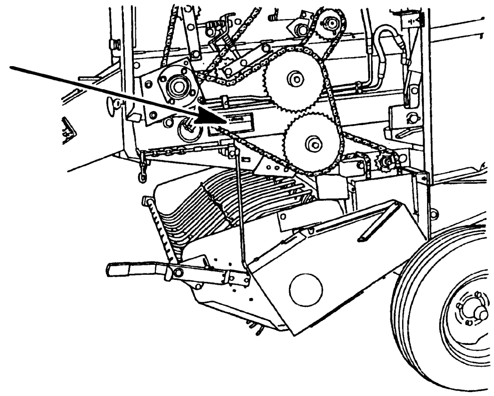
NEVER EJECT OR STORE BALES WHERE THEY COULD ROLL DOWNHILL!

HANDLING EQUIPMENT MUST HOLD BALES SECURELY AND HAVE STABILITY IN ALL OPERATING POSITIONS.

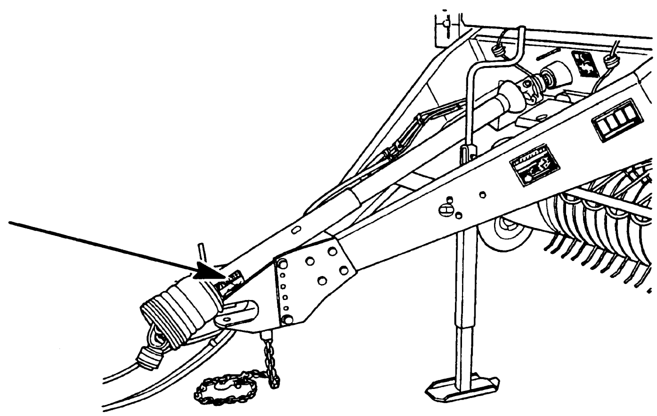
L52 285230



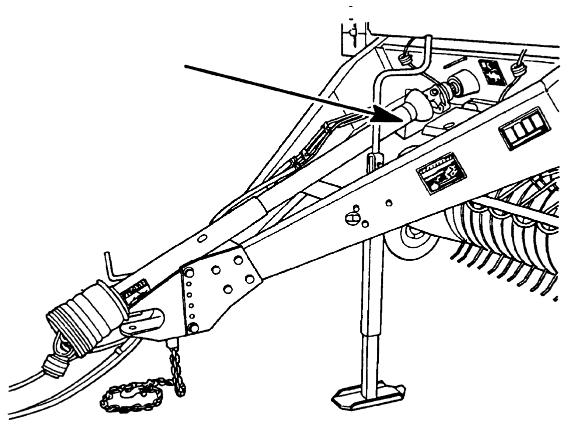

WARNING
KEEP HANDS AWAY FROM KNIFE MECHANISM.
SPRING LOADED PARTS MAY SNAP SHUT WHILE MAKING ADJUSTMENTS. CHECK OPERATOR'S MANUAL FOR ADJUSTMENT INSTRUCTIONS.
FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN INJURY TO HANDS OR FINGERS.




DANGER
ROTATING DRIVELINE
CONTACT CAN CAUSE DEATH
KEEP AWAY!
DO NOT OPERATE WITHOUT —
• ALL DRIVELINE, TRACTOR AND EQUIPMENT SHIELDS IN PLACE
• DRIVELINES SECURELY ATTACHED AT BOTH ENDS
• DRIVELINE SHIELDS THAT TURN FREELY ON DRIVELINE
WEASLER
13-10021-00



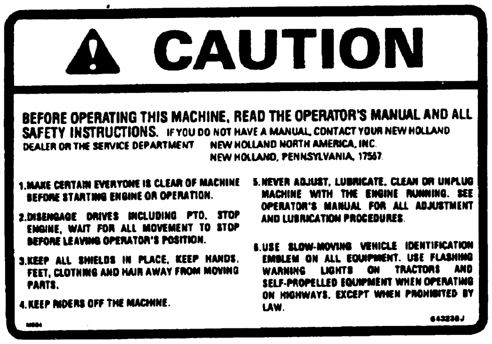

DANGER
SHIELD MISSING
DO NOT OPERATE
DANGER
SHIELD MISSING
DO NOT OPERATE
DANGER

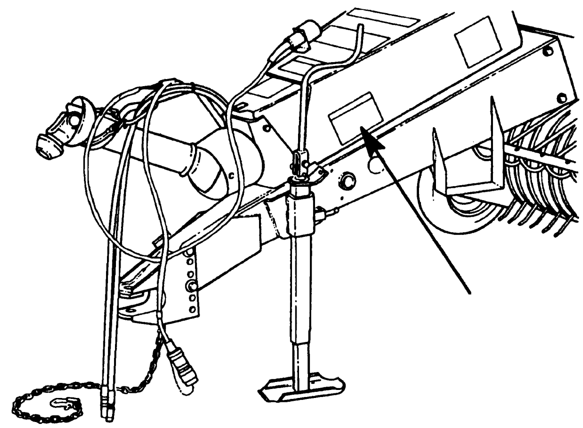


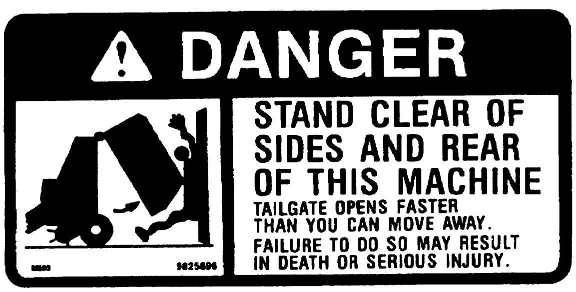
SAFETY DECALS - Models 644, 654, 664

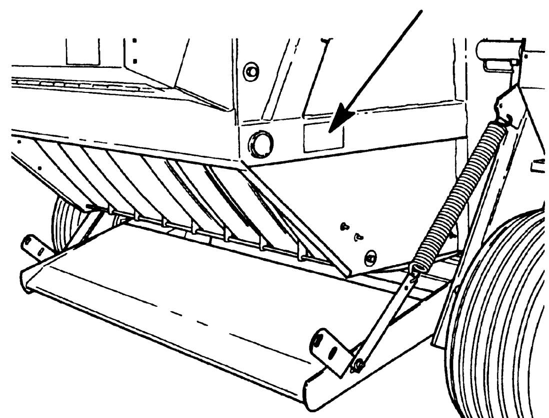
The following safety decals have been placed on your machine in the areas indicated. They are intended for the personal safety of you, and those working with you. Please take this manual walk around your machine and note the content and location of these warning signs. Review these decals and the operating instructions in this manual with your machine operators.

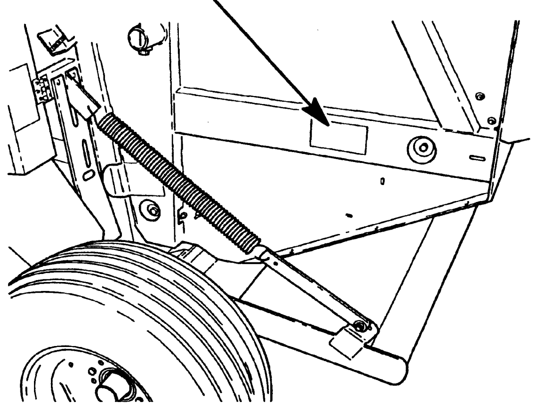
Keep the decals legible. If they are not, obtain replacements from your New Holland dealer.









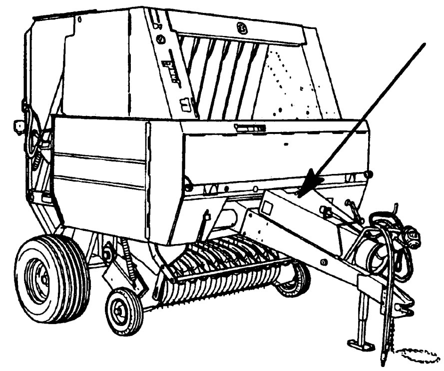


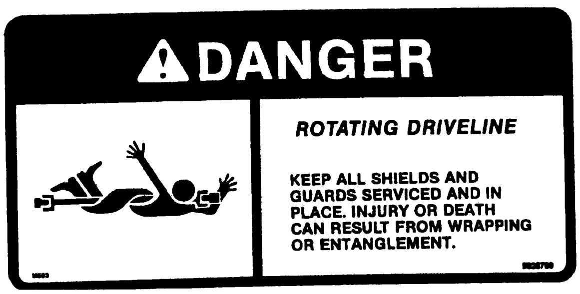
⚠ WARNING

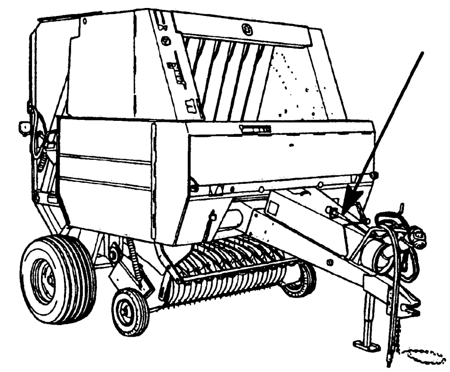
BALES MADE WITH THIS BALER ARE HEAVY, LARGE AND ROUND. PROPERTY DAMAGE OR INJURY COULD RESULT IF THEY ARE NOT HANDLED CAREFULLY!

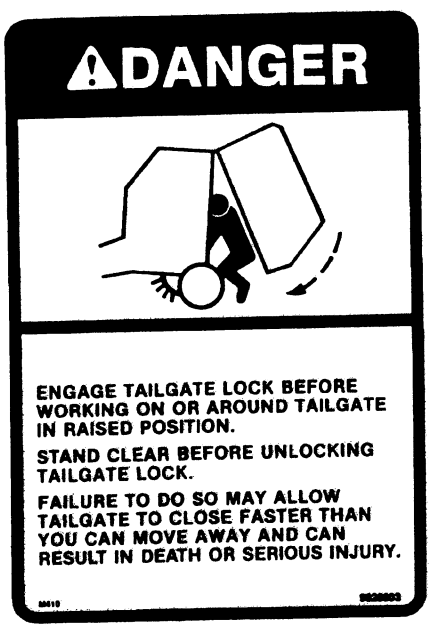
NEVER EJECT OR STORE BALES WHERE THEY COULD ROLL DOWNHILL!

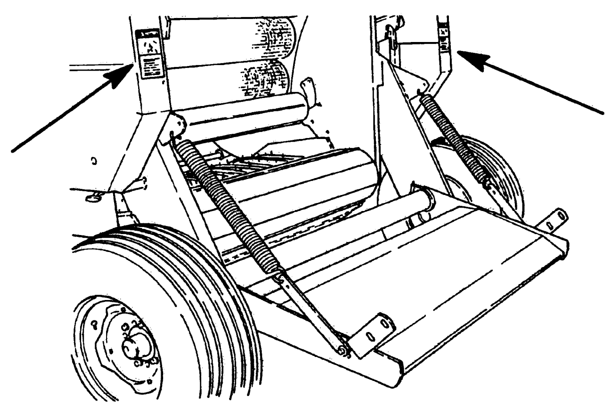
HANDLING EQUIPMENT MUST HOLD BALES SECURELY AND HAVE STABILITY IN ALL OPERATING POSITIONS.



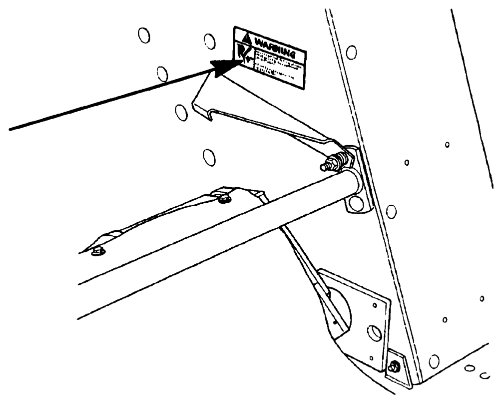




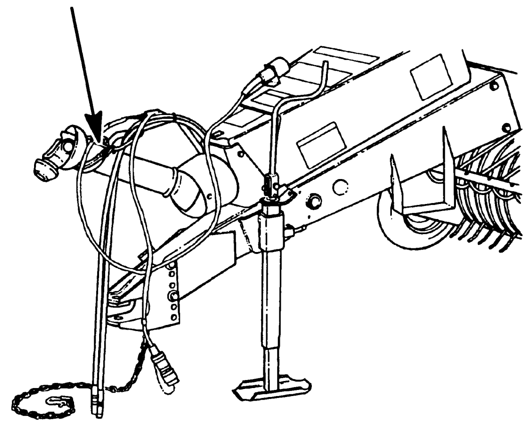




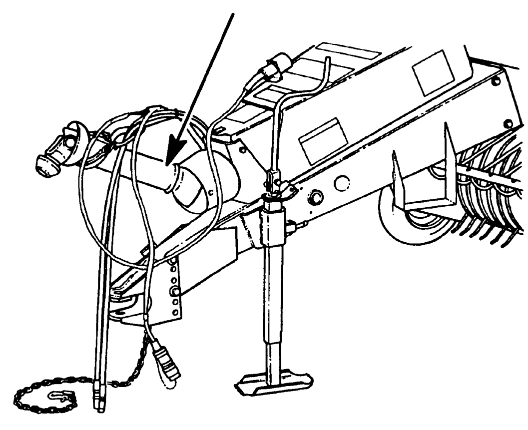

WARNING
DO NOT WORK ON NET WRAP ASSEMBLY WITHOUT FIRST ENGAGING NET KNIFE LOCKOUT LATCH.
FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY.
9840479




DANGER
ROTATING DRIVELINE
CONTACT CAN CAUSE DEATH
KEEP AWAY!
DO NOT OPERATE WITHOUT —
● ALL DRIVELINE, TRACTOR AND EQUIPMENT SHIELDS IN PLACE
● DRIVELINES SECURELY ATTACHED AT BOTH ENDS
● DRIVELINE SHIELDS THAT TURN FREELY ON DRIVELINE
WEASLER
13-10021-00




DANGER
SHIELD MISSING
DO NOT OPERATE
DANGER
SHIELD MISSING
DO NOT OPERATE
DANGER



BASIC COMPONENTS - Model 634

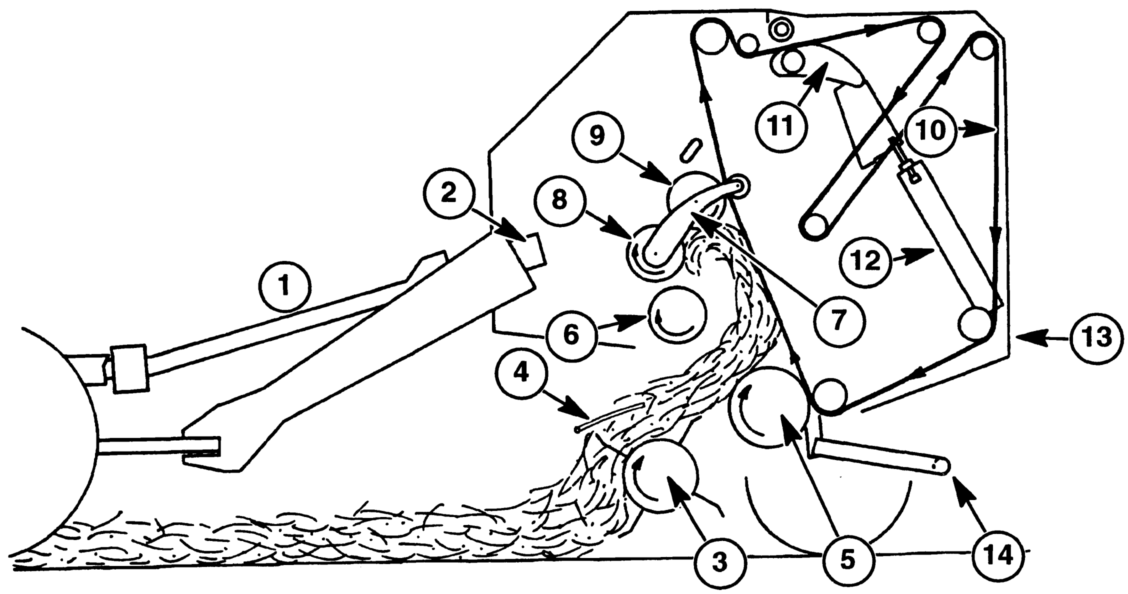


Figure 1-1

1 Power shaft
2 Gearbox
3 Pickup
4 Wind guard
5 Floor roll
6 Smooth roll
7 Pivot-roll arm
8 Fixed-position roll
9 Pivot roll
10 Belts
11 Belt tension arm
12 Bale density spring
13 Tailgate
14 Bale ejector

BASIC COMPONENTS - Models 644, 654, 664

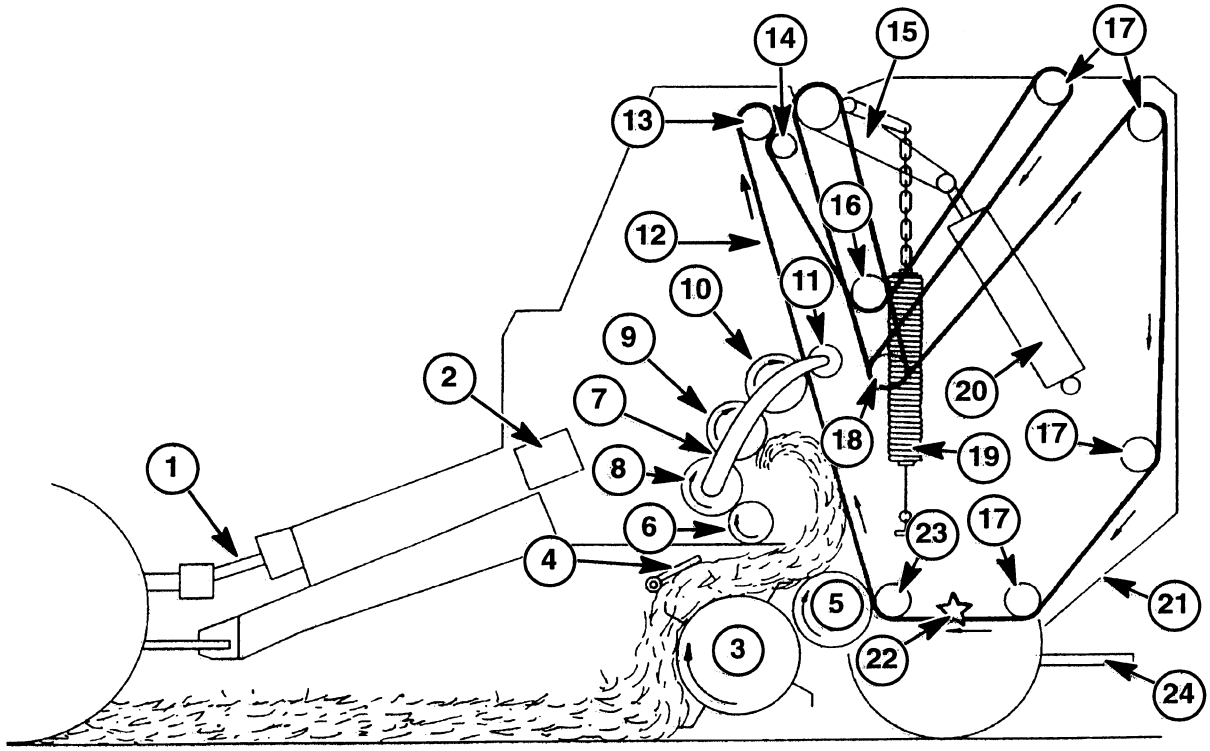


Figure 1-2

1 Drive shaft
2 Gearbox
3 Pickup
4 Wind guard
5 Floor roll
6 Starter roll
7 Pivot arm
8 Pivot roll
9 Middle roll
10 Stripper roll
11 Sledge follower roll
12 Belts
13 Belt drive roll
14 Back wrap roll
15 Belt tension arm
16 Front take-up roll
17 Tailgate idler rolls
18 Rear take-up roll
19 Belt tension spring
20 Belt tension cylinder
21 Tailgate
22 Expeller roll (optional)
23 Tailgate nose roll
24 Bale ejector

DRIVELINE COMPONENTS

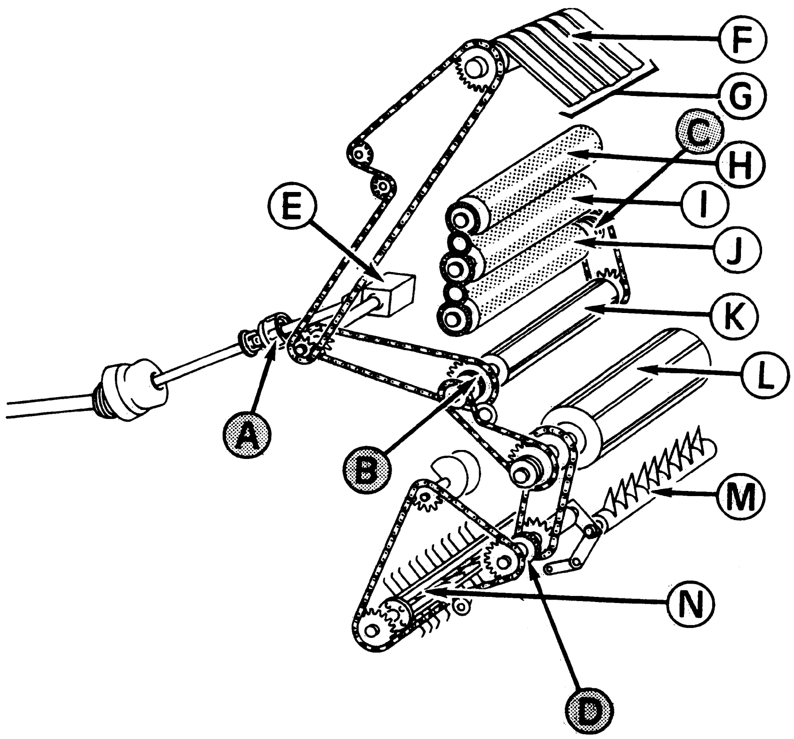


Figure 1-3

BASIC COMPONENTS

- A PTO slip clutch (disc-type - Models 654 and 664 only)
  NOTE: The Model 644 uses a shear bolt
- B Floor roll slip clutch (jaw-type)
- C Sledge roll slip clutch (disc-type)
- D Pickup slip clutch
  (disc-type - standard pickup)
  (jaw-type - wide pickup)
- E Gearbox (540 RPM or 1000 RPM)
- F Apron drive roll
- G Apron belts
- H Stripper roll
- I Middle roll
- J Pivot roll
- K Starter roll
- L Floor roll
- M Stuffer (wide pickup only)
- N Pickup (wide pickup shown)

DRIVELINE SCHEMATIC
Models 644, 654, 664

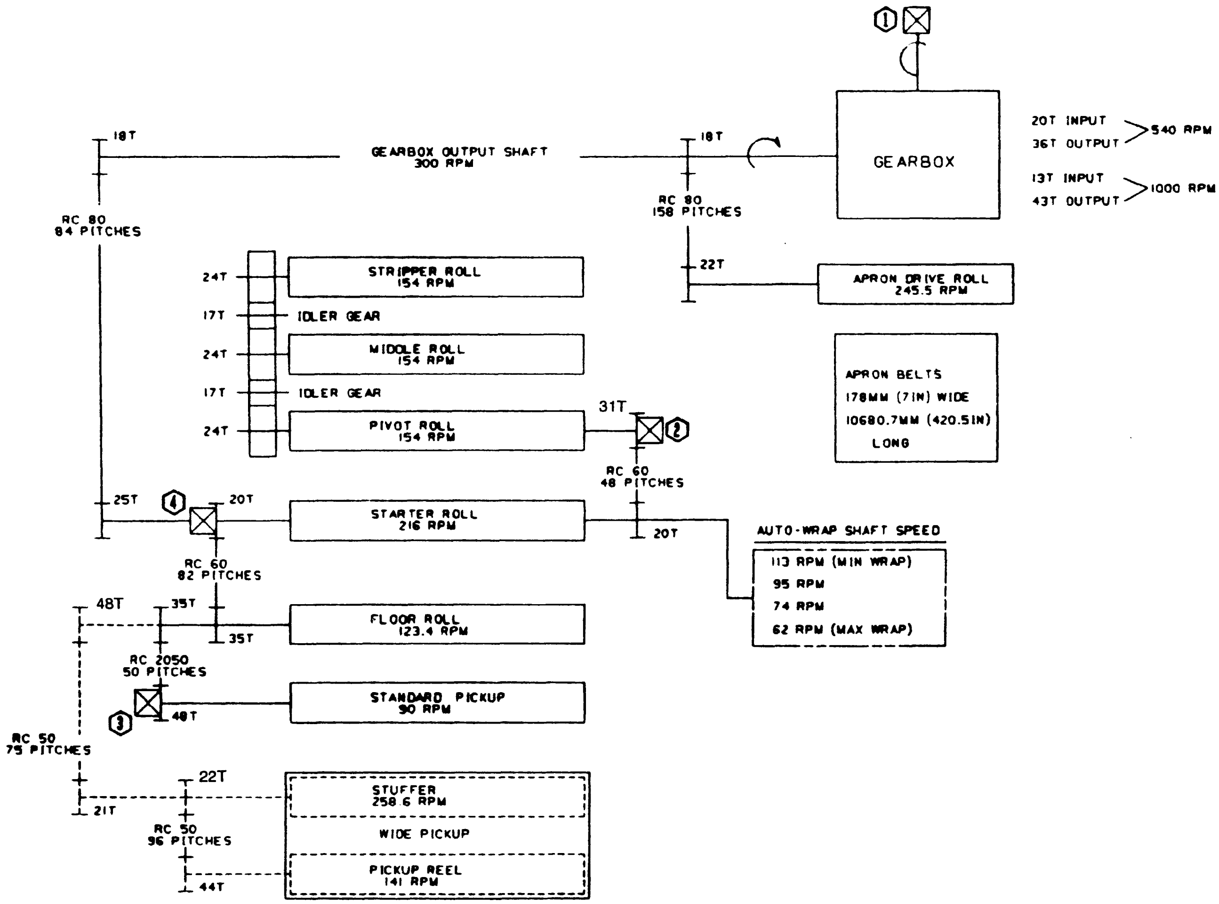


Figure 1-4

Slip Clutches

1. PTO slip clutch
2. Sledge roll slip clutch
3. Pickup slip clutch
4. Floor roll slip clutch

HARDWARE

General

The Models 634, 644, 654, and 664 balers have been built using mostly metric hardware. However, there are some places where inch hardware is required.

NOTE: Be sure to use the hardware specified when using tapped holes, as trying to install a metric bolt in an inch thread, or an inch bolt in a metric thread, will damage the thread.

The standard metric hardware callout might be for example M 8 x 16. The M indicates metric. The first number (8) is the diameter in millimeters. The second number (16) is the length in millimeters. Following the numbers there may be a letter designation such as CS (cap screw) or CB (carriage bolt).

Certain hardware must be tightened to specific torque specifications. If specific torque specifications are not noted, tighten the hardware to the standard torque chart specification listed in this manual.

PLATING

Hardware used on New Holland balers is plated with zinc-chromate (gold color). Gold- colored hardware has different torquing requirements from unplated or zinc-plated (silver color) hardware because of the difference in the coefficient of friction of the plating material. The torque charts in this manual list the correct specifications for gold, silver, and unplated bolts.

NUT TIGHTENING

Whenever possible, the nut should be tightened, not the head of the bolt. When tightening using the bolt head, the clamp load can be lost because some of the torque applied twists the bolt instead of tensioning (stretching) it. The tension on the bolt is what holds the joint together.

Approximately 90% of the torque applied during assembly goes to overcoming friction between the parts. The other 10% is used to tension (stretch) the bolt. After assembly, the frictional forces disappear, which is the basis for the saying "If it does not fail during assembly, it will not fail in service." The bolt may later fail due to other factors, but not from being over-tightened.

LOCKNUTS

Most locknuts are coated with a special lubricant that is dry to the touch. Anytime a locknut is used, a lower than normal torque is required. Refer to the torque charts in this manual for specific values.

JAM NUTS

When using a jam nut to lock a regular nut, the jam nut should be installed first and tightened to one-half the recommended torque, then held in place while installing a regular nut to the recommended torque.

THREAD LUBRICATION

The addition of antiseize compound, Molykote, oil, graphite, or any other lubricant to a bolt decreases the friction between it and a nut. This makes it necessary to reduce the recommended torque to prevent over-tensioning of the bolt. When using the torque charts in this manual, decrease the value by 20% whenever a lubricant is used.

MINIMUM HARDWARE TIGHTENING TORQUES

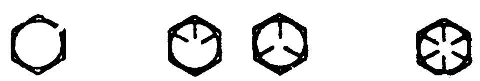
IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

INCH HARDWARE AND LOCKNUTS

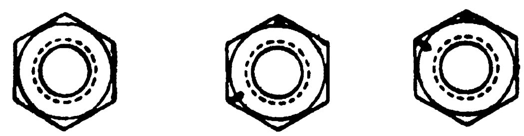
NOMINAL SIZE	SAE GRADE 2 UNPLATED or PLATED SILVER	SAE GRADE 2 PLATED W/ZnCr GOLD	SAE GRADE 5 UNPLATED or PLATED SILVER	SAE GRADE 5 PLATED W/ZnCr GOLD	SAE GRADE 8 UNPLATED or PLATED SILVER	SAE GRADE 8 PLATED W/ZnCr GOLD	LOCKNUTS GR.B w/GR5 BOLT	LOCKNUTS GR.C w/GR8 BOLT	NOMINAL SIZE
1/4	55* (6.2)	72* (8.1)	86* (9.7)	112* (13)	121* (14)	157* (18)	61* (6.9)	86* (9.8)	1/4
5/16	115* (13)	149* (17)	178* (20)	229* (26)	250* (28)	324* (37)	125* (14)	176* (20)	5/16
3/8	17 (23)	22 (30)	26 (35)	34 (46)	37 (50)	48 (65)	19 (26)	26 (35)	3/8
7/16	27 (37)	35 (47)	42 (57)	54 (73)	59 (80)	77 (104)	30 (41)	42 (57)	7/16
1/2	42 (57)	54 (73)	64 (87)	83 (113)	91 (123)	117 (159)	45 (61)	64 (88)	1/2
9/16	60 (81)	77 (104)	92 (125)	120 (163)	130 (176)	169 (229)	65 (88)	92 (125)	9/16
5/8	83 (112)	107 (145)	128 (174)	165 (224)	180 (244)	233 (316)	90 (122)	127 (172)	5/8
3/4	146 (198)	189 (256)	226 (306)	293 (397)	319 (432)	413 (560)	160 (217)	226 (306)	3/4
7/8	142 (193)	183 (248)	365 (495)	473 (641)	515 (698)	667 (904)	258 (350)	364 (494)	7/8
1	213 (289)	275 (373)	547 (742)	708 (960)	773 (1048)	1000 (1356)	386 (523)	545 (739)	1

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
CAP SCREWS AND CARRIAGE BOLTS

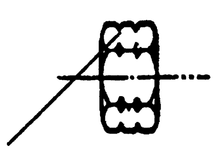


SAE GRADE 2 SAE GRADE 5 SAE GRADE 8



REGULAR NUTS SAE GRADE 5 HEX NUTS SAE GRADE 8 HEX NUTS

LOCKNUTS



GRADE IDENTIFICATION

GRADE A NO NOTCHES

GRADE B ONE CIRCUMFERENTIAL NOTCH

GRADE C TWO CIRCUMFERENTIAL NOTCHES

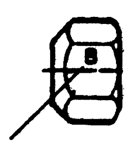
GRADE IDENTIFICATION

GRADE A NO MARKS

GRADE B THREE MARKS

GRADE C SIX MARKS

MARKS NEED NOT BE LOCATED AT CORNERS



GRADE A NO MARK
GRADE B LETTER B
GRADE C LETTER C

GRADE IDENTIFICATION

MINIMUM HARDWARE TIGHTENING TORQUES

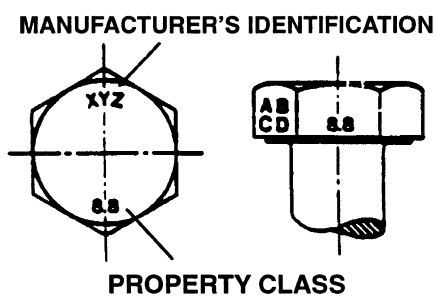
IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC HARDWARE AND LOCKNUTS

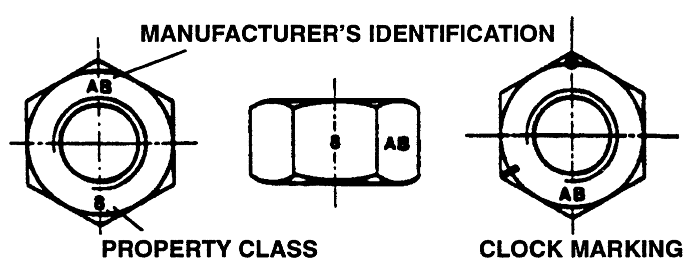
NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	15* (1.7)	19* (2.2)	23* (2.6)	30* (3.4)	33* (3.7)	42* (4.8)	16* (1.8)
M6	51* (5.8)	67* (7.6)	79* (8.9)	102* (12)	115* (13)	150* (17)	56* (6.3)
M8	124* (14)	159* (18)	195* (22)	248* (28)	274* (31)	354* (40)	133* (15)
M10	21 (28)	27 (36)	32 (43)	41 (56)	45 (61)	58 (79)	22 (30)
M12	36 (49)	46 (63)	55 (75)	72 (97)	79 (107)	102 (138)	39 (53)
M16	89 (121)	117 (158)	137 (186)	177 (240)	196 (266)	254 (344)	97 (131)
M20	175 (237)	226 (307)	277 (375)	358 (485)	383 (519)	495 (671)	195 (265)
M24	303 (411)	392 (531)	478 (648)	619 (839)	662 (897)	855 (1160)	338 (458)

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
HEX CAP SCREW AND CARRIAGE BOLTS
CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS
CLASSES 05 AND UP



Socket or Wrench Size		
U.S. Standard (Inch)		
Bolt Diameter	Bolt Head	Nut
1/4	3/8	7/16
5/16	1/2	9/16
3/8	9/16	5/8
7/16	5/8	3/4
1/2	3/4	13/16
9/16	7/8	7/8
5/8	15/16	1
3/4	1 1/8	1 1/8
7/8	1 5/16	1 5/16
1	1 1/2	1 1/2

Socket or Wrench Size		
Metric		
Bolt Diameter	Bolt Head	Nut
6 mm	10 mm	10 mm
8 mm	14 mm	14 mm
10 mm	17 mm	17 mm
12 mm	19 mm	19 mm
14 mm	22 mm	22 mm
16 mm	24 mm	24 mm
18 mm	27 mm	27 mm
22 mm	32 mm	32 mm
24 mm	36 mm	36 mm

TAPERED SPLINES

In an installation where a component such as a flywheel, shaft, gear, etc. is attached to a shaft with tapered splines and held in place with a washer and cap screw, it must be hammer seated.

Be sure the splines in both components are clean. Install the component. Be sure the shaft does not protrude through the component; if it does, check for excessive wear in either component. Install the washer and cap screw. Tighten the cap screw to the corresponding torque for that bolt size or to the specified torque for that component.

Strike the hub of the component with a hammer or use a punch and hammer if necessary. Recheck the torque. Repeat the process until the torque of the bolt holds.

NOTE: The washer must not bottom out on the shaft before the component is tight.

CHARTS AND TABLES

CONVERSION CHART

	foot	yard	mile	inch	meter
1 foot	1	0.333	-	12	0.3048
1 yard	3	1	-	36	0.9144
1 mile	5280	1760	1	63360	1609.35
1 inch	0.0833	0.0277	-	1	0.0254
1 meter	3.281	1.0936	-	39.37	1

1 US bushel	=	35.2391 liters	1 liter	=	0.028 US bushel
1 US quart	=	0.9464 liters	1 liter	=	1.056 US quart
1 UK bushel	=	36.3687 liters	1 liter	=	0.027 UK bushel
1 UK quart	=	1.1365 liters	1 liter	=	0.879 UK quart
1 US gallon	=	3.785 liters	1 liter	=	0.264 US gallon
1 UK gallon	=	4.5461 liters	1 liter	=	0.22 UK gallon
1 barrel	=	158.987 liters	1 liter	=	0.0063 barrel

1 acre	=	0.4047 ha	1 ha	=	2.471 acres
1 pound	=	0.4536 kg	1 kg	=	2.204 pounds
1 hp	=	0.736 kW	1 kW	=	1.358 hp
1 lb/sq. in.	=	0.0689 bar	1 bar	=	14.5 lbs./sq. in.

CONVERSION TABLES

Metric to English		
1 millimeter (mm)	= 0.03937	inch
1 centimeter (cm)	= 0.3937	inch
1 meter (m)	= 39.37	inches
	= 3.2808	feet
	= 1.0936	yards

English to Metric		
1 inch	= 25.4	millimeters (mm)
	= 2.54	centimeters (cm)
1 foot	= 304.8	millimeters (mm)
	= 30.48	centimeters (cm)
	= 0.3048	meter (m)
1 yard	= 91.44	centimeters (cm)
	= 0.9144	meter (m)

CONVERSION MULTIPLIERS

When You Know	Multiply By*	To Find
millimeters	0.04	inches
centimeters	0.39	inches
meters	3.28	feet
meters	1.09	yards
Newton-meters	0.737	foot-pounds

When You Know	Multiply By*	To Find
inches	2.54	centimeters
feet	30.5	centimeters
yards	0.91	meters
foot-pounds	1.356	Newton-meters

**Approximate*

FRACTIONS, DECIMALS AND MILLIMETERS CHART

Inches		mm	Inches		mm
1/64	.016	0.40	33/64	.516	13.10
1/32	.031	0.79	17/32	.531	13.49
3/64	.047	1.19	35/64	.547	13.89
1/16	.062	1.59	9/16	.562	14.29
5/64	.078	1.98	37/64	.578	14.68
3/32	.094	2.38	19/32	.594	15.08
	.100	2.54		.600	15.24
7/64	.109	2.78	39/64	.609	15.48
1/8	.125	3.18	5/8	.625	15.88
9/64	.141	3.57	41/64	.641	16.27
5/32	.156	3.97	21/32	.656	16.67
11/64	.172	4.37	43/64	.672	17.07
3/16	.188	4.76	11/16	.688	17.46
13/64	.203	5.16	45/64	.703	17.86
7/32	.219	5.56	23/32	.719	18.26
15/64	.234	5.95	47/64	.734	18.65
1/4	.250	6.35	3/4	.750	19.05
17/64	.266	6.75	49/64	.766	19.45
9/32	.281	7.14	25/32	.781	19.84
19/64	.297	7.54	51/64	.797	20.24
5/16	.312	7.94	13/16	.812	20.64
21/64	.328	8.33	53/64	.828	21.03
11/32	.344	8.73	27/32	.844	21.43
23/64	.359	9.13	55/64	.859	21.83
3/8	.375	9.53	7/8	.875	22.23
25/64	.391	9.92	57/64	.891	22.62
	.400	10.16		.900	22.86
13/32	.406	10.32	29/32	.906	23.02
27/64	.422	10.72	59/64	.922	23.42
7/16	.438	11.11	15/16	.938	23.81
29/64	.453	11.51	61/64	.953	24.21
15/32	.469	11.91	31/32	.969	24.61
31/64	.484	12.30	63/64	.984	25.00
1/2	.500	12.70	1	1.000	25.40

SECTION 2

PTO DRIVELINE

This section details the removal and repair of the PTO and driveline on the Models 634, 644, 654, and 664 round balers.

TELESCOPING PTO

Model 634

This model baler uses a PTO driveline that combines the universal joint in a constant velocity-type driveline. At the rear of the assembly is the shear bolt protection system.

The Model 634 requires only that the rear slide collar, 1, be released to remove the PTO assembly from the baler.

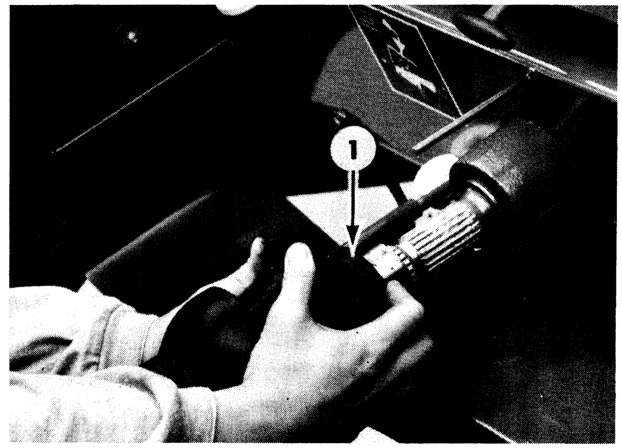


Figure 2-1

2509-4

PTO SHAFT

634

The 634 PTO shaft can be disassembled and assembled in a similar manner to most universal joints. This section will cover the complete disassembly of the shaft. Disassemble only the amount of the shaft that is needed to make the repair.

Figure 2-2 shows the complete PTO assembly:
- 1 is the front PTO assembly.
- 2 is the rear PTO assembly.

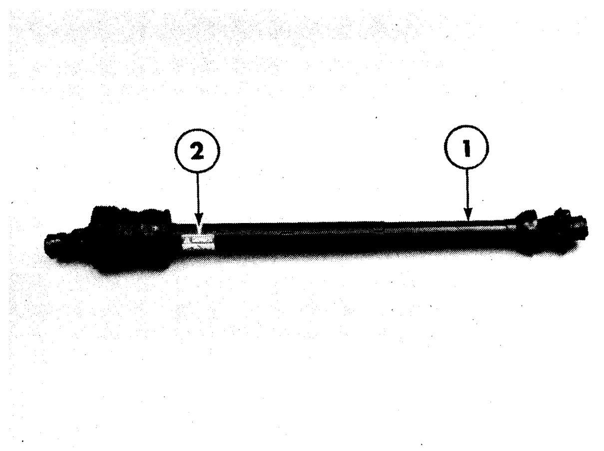


Figure 2-2

A595-1

FRONT PTO SHAFT DISASSEMBLY

Use a screwdriver to disengage snap ring, 1, from the groove in shield, 2. Slide the PTO shaft, 3, out of shield, 2.

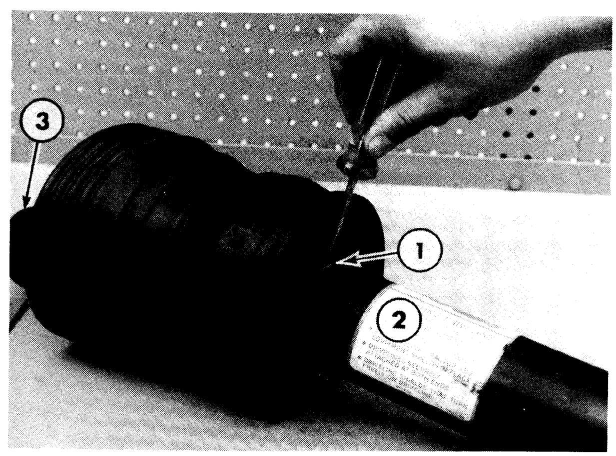


Figure 2-3

A595-8

Remove the snap rings, 1, that retain the bearing caps, 2, in the center section, 3.

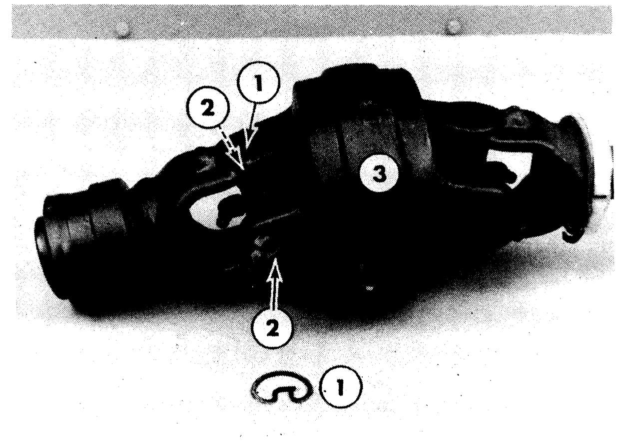


Figure 2-4

A595-7

Use an open vise to support each ear of the front yoke, 1. Use a hammer to strike the ear of the center section, 2, and drive the bearing cap, 3, out of the center section. Use the vise or a pair of pliers to remove the bearing cap from the center section. Remove the other bearing cap from the center section in a similar manner.

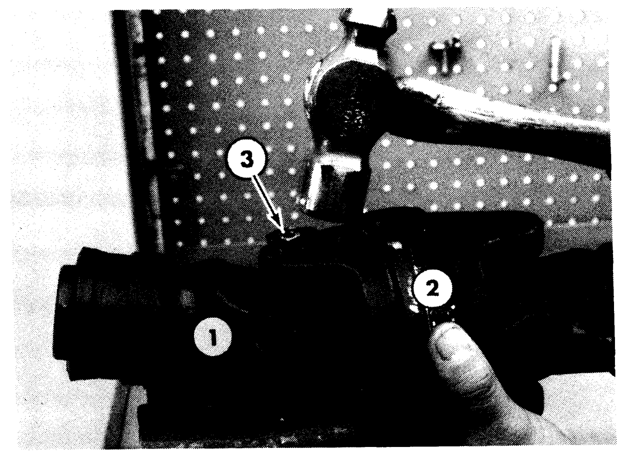


Figure 2-5

A595-5

Remove the snap rings, 1, that retain the bearing caps, 2, in the front yoke, 3.

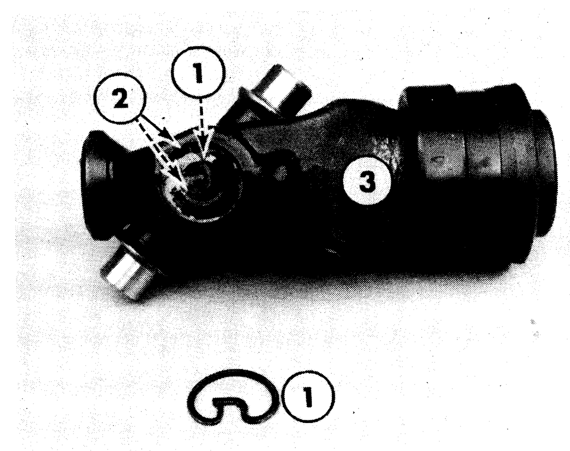


Figure 2-6

A595-11

In an open vise, support the ears of the cross, 1. Use a hammer to strike the front yoke, 2, to drive out the bearing cap, 3. Remove the remaining bearing cap in a similar manner. Then remove the cross, 1, from the yoke.

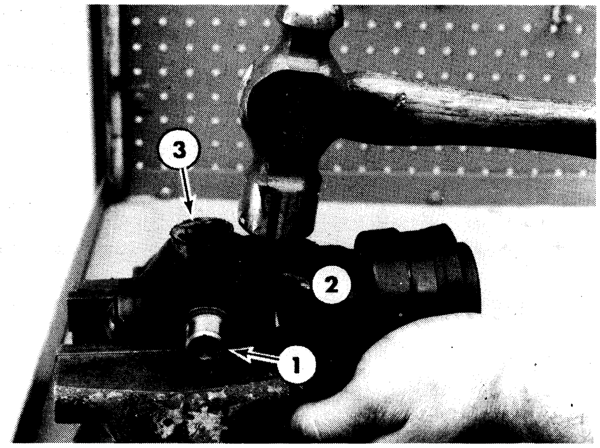


Figure 2-7

A595-9

To remove the front yoke lock collar, 1, and locking balls, remove snap ring, 2.

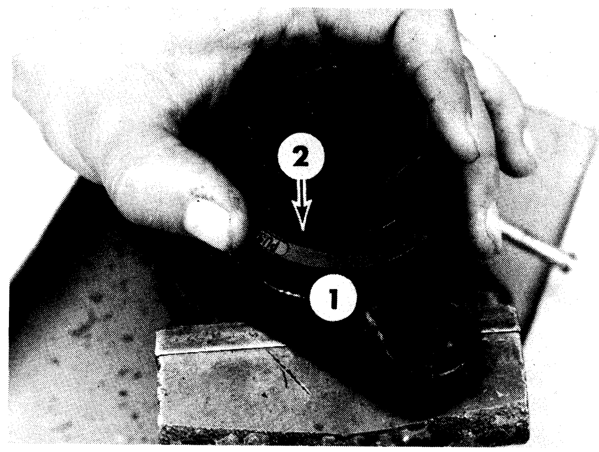


Figure 2-8

A596-3

To remove bell extension, 1, from the outer shield, 2, place the bell extension on a table and pull the end of the outer shield down to disengage it from the bell extension.

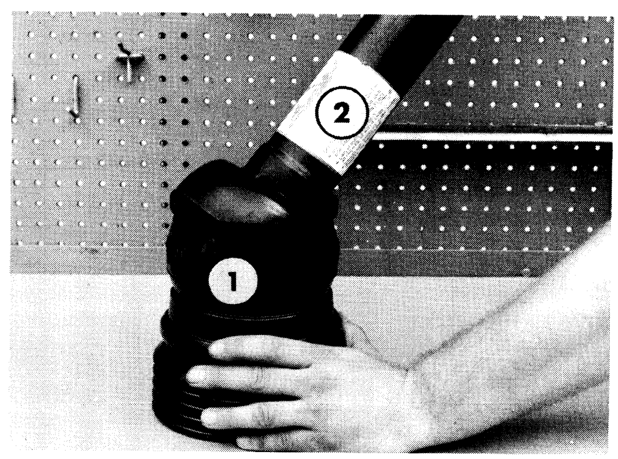


Figure 2-9

A596-8

Remove the snap rings from the bearing caps at 1 and support the ears on the front shaft, 2, in an open vise. Use a hammer to strike center section, 3, and remove the bearing cap. Remove the other bearing cap from the center section in a similar manner.

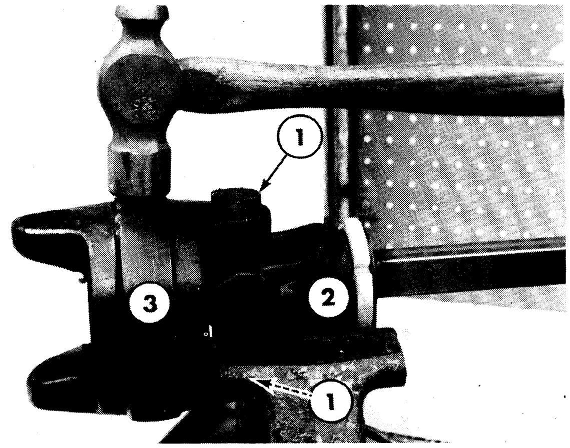


Figure 2-10

A596-2

Remove the snap rings from the bearing caps at 1 and support the cross, 2, in an open vise. Use a hammer to strike the shaft, 3, and remove the bearing caps and cross.

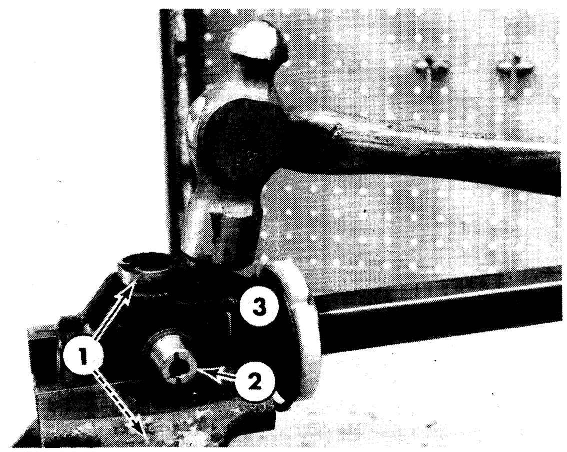


Figure 2-11

A596-1

REAR PTO SHAFT DISASSEMBLY

Remove the outer PTO shield, 1, by using a screwdriver to remove the snap ring at 2. Slide the PTO shaft assembly, 3, out of the outer shield, 1.

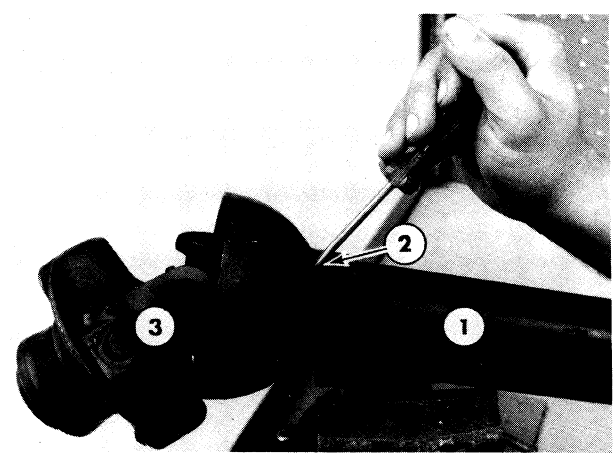


Figure 2-12

A596-5

Remove the snap rings, 1, from the four bearing caps at 2. Remove the four bearing caps and cross, 3, in a similar manner as the front universal joints.

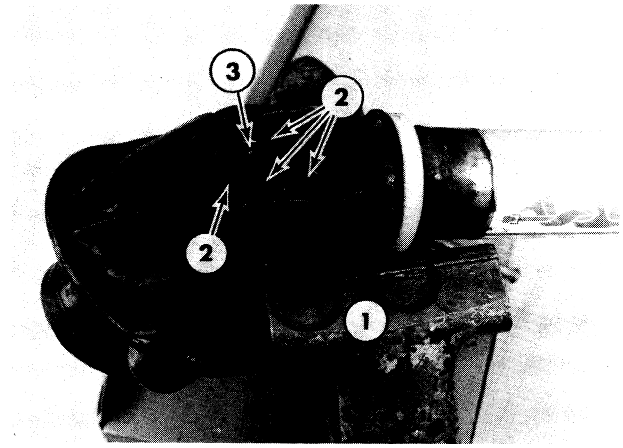


Figure 2-13

A596-12

To disassemble the rear yoke assembly, remove shear bolt, 1, and plug, 2.

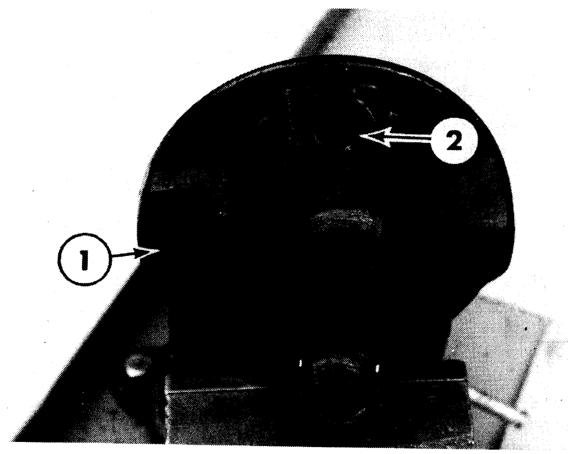


Figure 2-14

A596-11

Use a magnet to remove the 24 steel balls, 1, from the groove in the yoke, 2. This will allow you to separate yoke, 2, and coupler, 3.

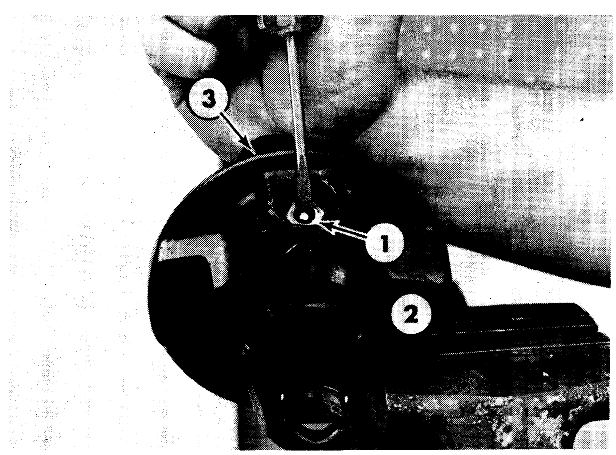


Figure 2-15

A595-2

To remove the lock collar, 1, and locking balls from the coupler, remove snap ring, 2.

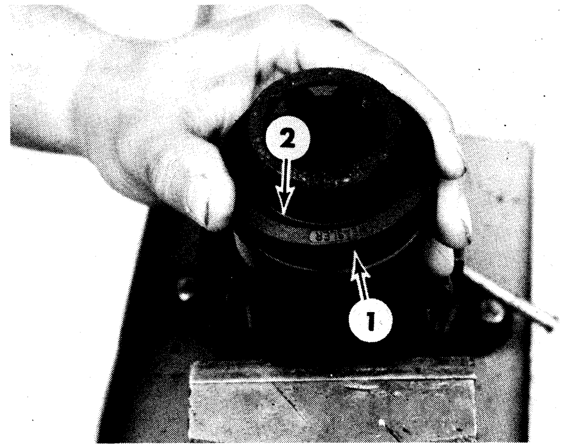


Figure 2-16

A596-10

Figure 2-17 shows the layout of the parts for the PTO assembly.

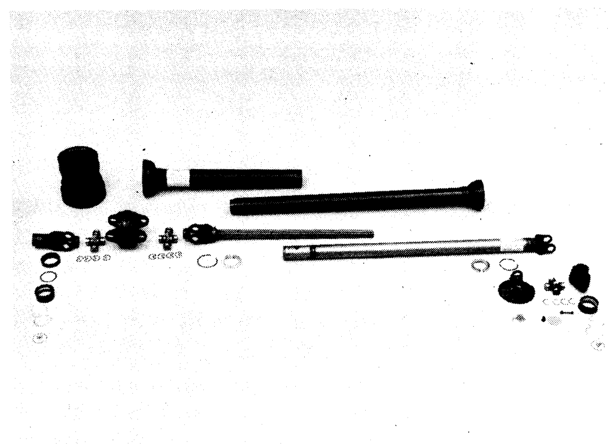


Figure 2-17

A596-9

INSPECTION

Make sure the discs and plates, 1, in the center section are not broken or worn.

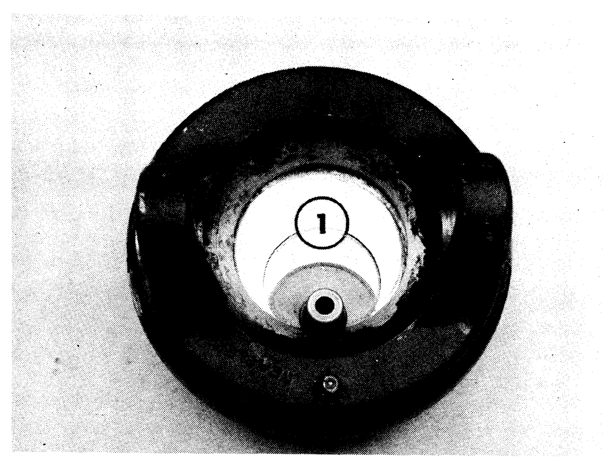


Figure 2-18

A596-6

Make sure the balls, 1, in the yokes are free to pivot, but are not loose in the bore, 2.

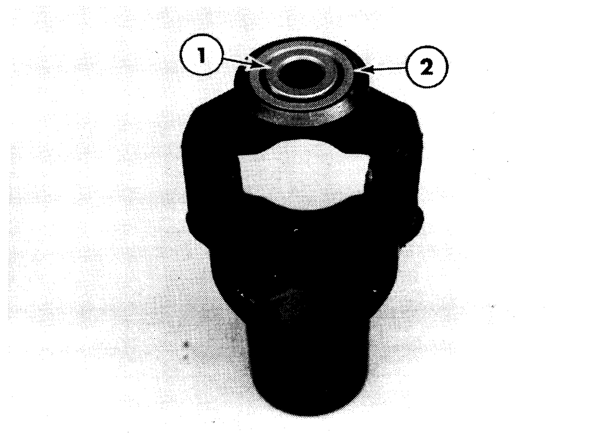


Figure 2-19

A596-7

FRONT AND REAR PTO SHAFT ASSEMBLY

The universal joints are assembled in the reverse order of disassembly.

Install the cross, 1, and a bearing cap, 2, in the yoke. Use a vise to press the cap in the yoke. Install the remaining cap in the yoke and press it in the yoke. Use a spacer, 3, to press the bearing cap in the yoke far enough to install the snap rings. If the universal joint is tight after assembly, strike the yoke with a hammer to free the universal joint.

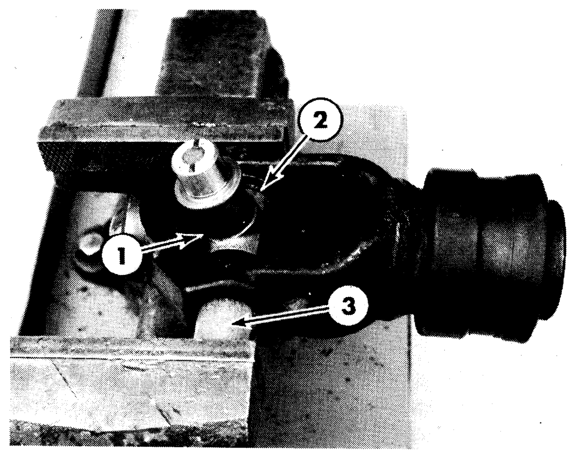


Figure 2-20

A595-4

Lubricate pins, 1, with grease before the front yoke or rear shaft, 2, is installed on the center section.

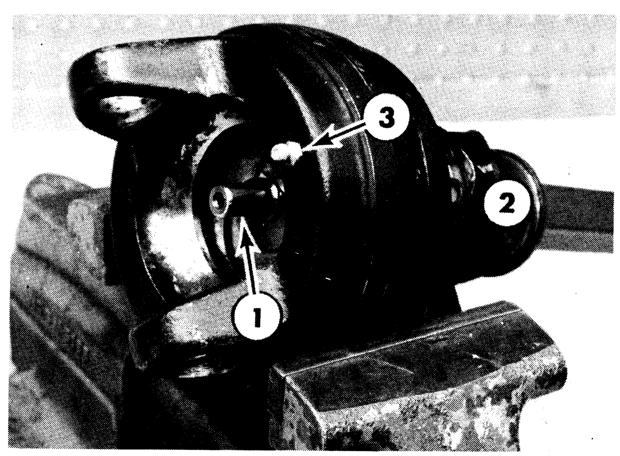


Figure 2-21

A597-1

When installing either the yoke and shaft or front yoke on the center section, make certain ball, 1, is turned with the flat side out.

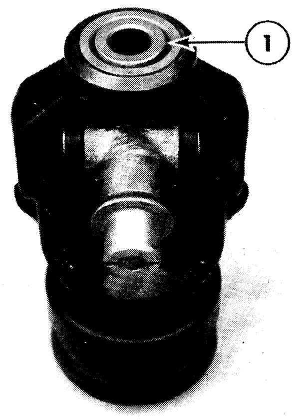


Figure 2-22

A595-3

To install the bell extension, 1, on the outer shield, 2, place the large end of the extension on a table. Slowly rotate the outer shield, 2, while pushing it in the bell extension, 1, at a 45° angle.

After the PTO shaft is assembled, lubricate all fittings as described in the operator's manual.

NOTE: If a new center section is installed, it must be filled with grease through fitting, 3, Figure 2-21.

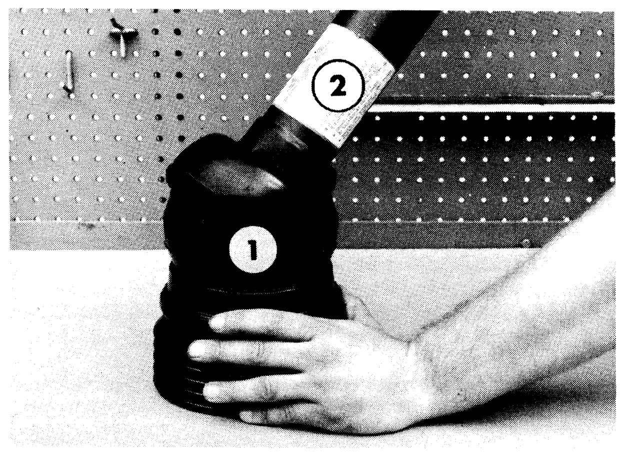


Figure 2-23

A596-8

Models 644, 654, and 664

Depending on the model, the series or size of the U-joints will vary. The procedure for disassembly will remain fairly consistent among all models. The Model 644 uses a tough plastic shield which uses 2 or 3 nylon keepers to secure the shield to the shaft.

Figure 2-24

2509-1

The Models 654 and 664 use a retaining ring, 1, which is disengaged from the inner shield.

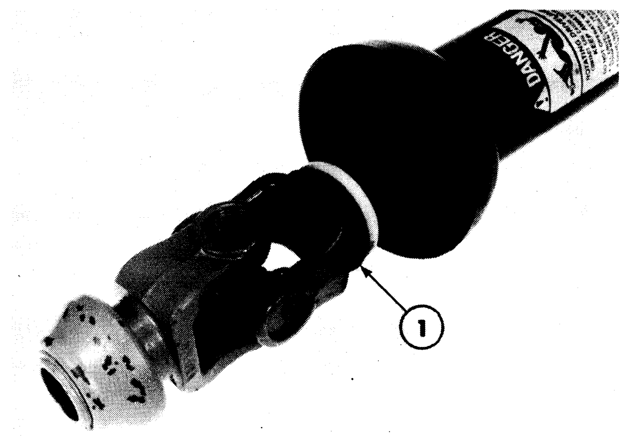


Figure 2-25

A2529-5

REMOVAL OF PTO FROM DRIVE SHAFT

The front section can be slid off the assembly. Be careful not to drop the assembly, as shield damage can occur.

To remove the rear PTO half, open the top shield, as shown, and loosen the jam nut at 3. Loosen and remove cap screw, 2. Using a pry bar, remove the PTO assembly from the shaft.

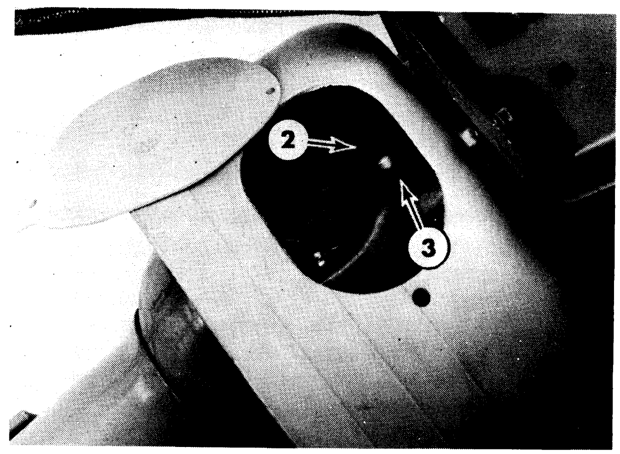


Figure 2-26

2364-5

Disassembly

1. PTO Shields - Depending on models, remove the shield retainer, as shown in Figure 2-24 or 2-25. Then slide off the shield.

2. PTO U-joints - Remove the retainer snap rings for the bearing caps. There may be internal-type snap rings which can be removed with a screwdriver, as shown.

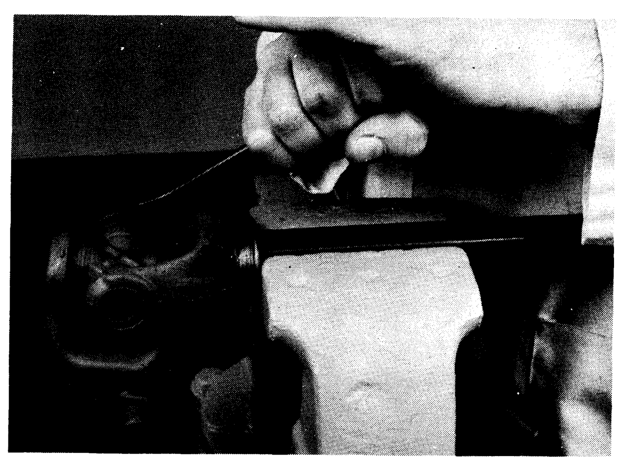


Figure 2-27

On an external- type snap ring, remove with a pair of pliers as shown.

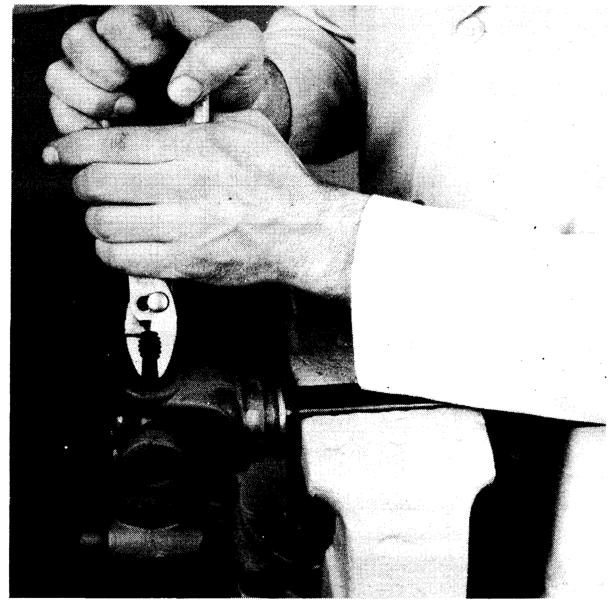


Figure 2-28

Set the U-joint across the open jaws of a vise and drive the bearing cap out of the yoke. It may not move completely apart.

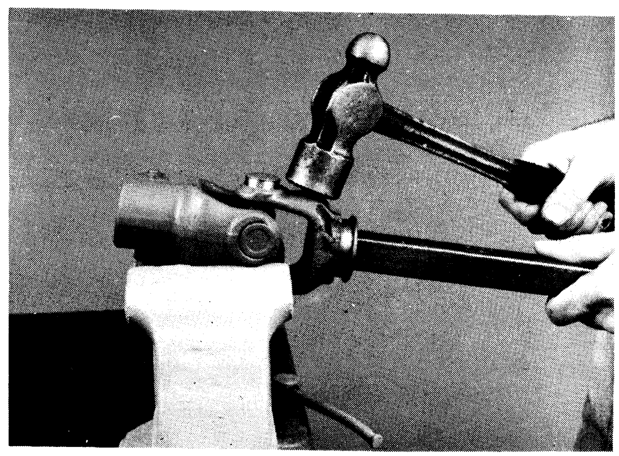


Figure 2-29

If it does not, clamp the bearing cap in a vise and tap on the yoke.

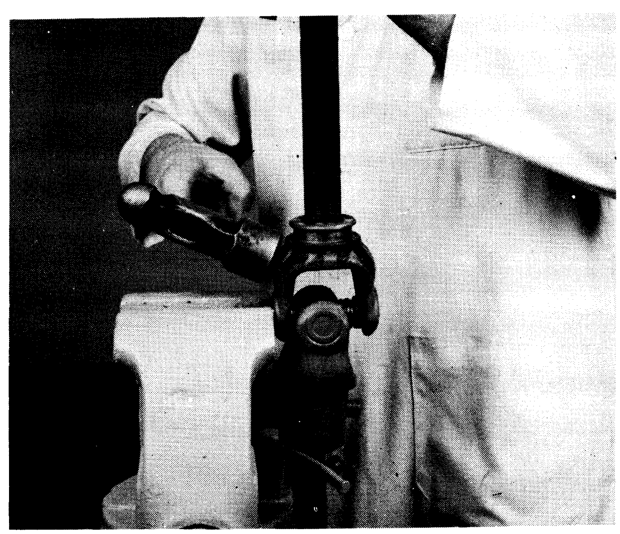


Figure 2-30

Complete U-joint removal.

When the first set of bearing caps is removed, the cross can be set across the jaws of the vise, and the remaining bearing caps can be removed.

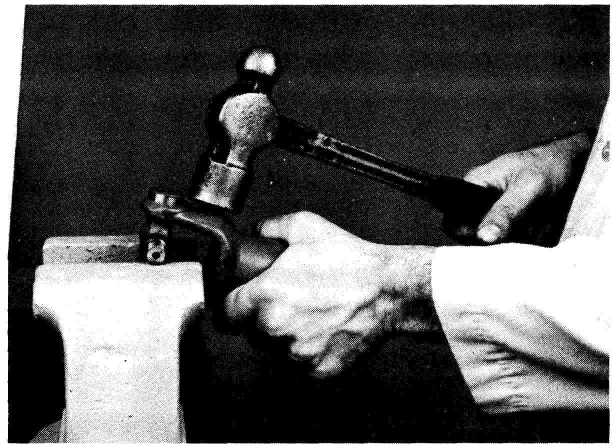


Figure 2-31

INSPECTION

All parts must be inspected for wear or broken parts and replaced as necessary. All bent and broken PTO shields and their carrier bearings must be replaced on the PTO assembly.

IMPORTANT: Do not mix new parts with old worn parts or early failures will occur.

Before installing a new cross and bearings, be sure the grease fitting is out of the cross. Check the bearing caps for proper needle bearing location. When all the bearings are in place, apply some clean gun grease in the caps to hold the needle bearings in place. Be sure all shields and seals are in place on the cross and bearing cap.

ASSEMBLY

1. PTO U-joints - Place the cross in the yoke, being sure to have it positioned with the grease fitting hole toward the access area. In this case, it would be away from the PTO shield which is on the longer shaft.

   Push the cross into the yoke hole as far as possible and drive the first bearing cap into the yoke. Be sure to keep the cross into the cap as far as possible to prevent the needle bearings from moving in the bearing cap. Support the yoke as shown in Figure 2-32. After putting one bearing cap in place, install the other one.

   On external snap ring units, place a shaft about the same size as the bearing cap on the bearing cap and use it as a punch.

   To start the next bearing caps, proceed as shown in Figure 2-33. Completion should be done as shown in Figure 2-32, supporting the yoke while installing the bearing cap. This prevents the yoke from being sprung during installation.

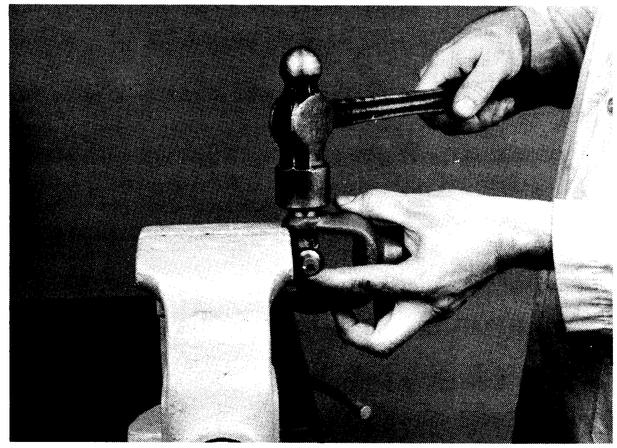


Figure 2-32

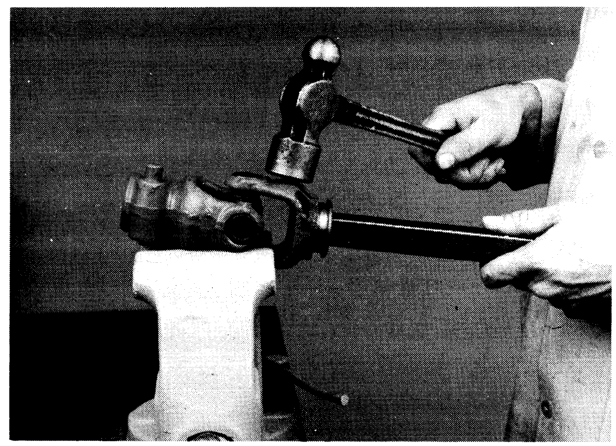


Figure 2-33

After all the bearing caps are installed, the snap ring can be installed as shown. If the bearing cap does not fit all the way, it will be impossible to put the snap rings in place. The yoke may be sprung or a needle bearing may have fallen in the bearing cap. The needle bearing problem can be detected when an excess of space exists between the cross and bearing cap seal.

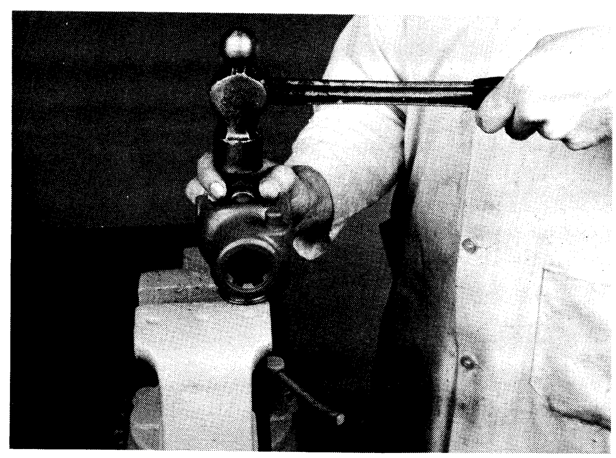


Figure 2-34

The U-joint may be tight at this point, so it may be necessary to open the vise and place the U-joint in, as in the disassembly, and lightly tap the yoke to seat the snap rings.

Install the grease fitting and lubricate the bearing.

2. PTO Shields - Be sure the nylon bearing is installed on the front of the rear section of the PTO before the shield is slipped on and secured.

   Apply a multipurpose grease to the shaft of the PTO and install the PTO into the shield after the snap ring or nylon retainer bearings are installed. Refer to Figures 2-24 and 2-25.

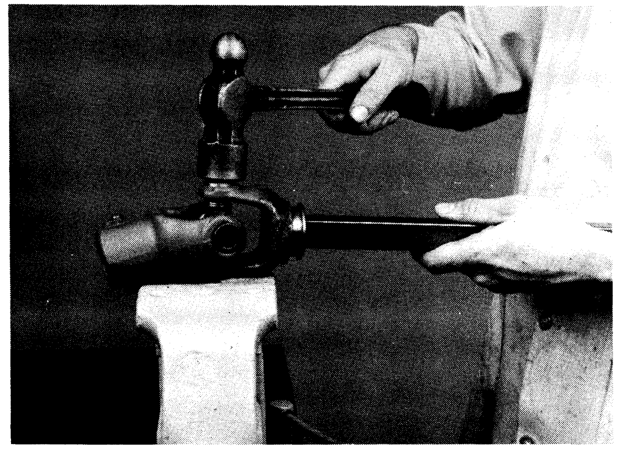


Figure 2-35

SLIDE COLLAR - QUICK DISCONNECT

Two styles of quick disconnect are used on round balers.

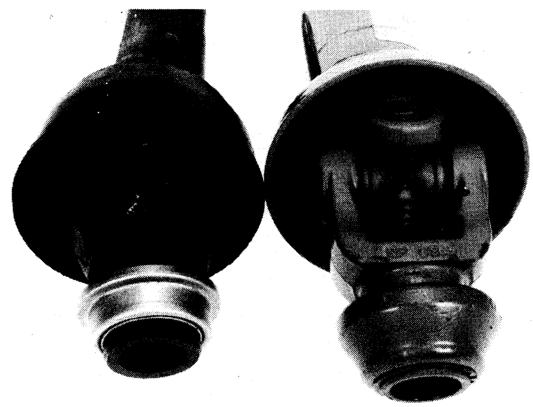


Figure 2-36

A2765-9

Style I is produced by Walterscheid, using a metal slide collar and a round retainer ring, 1.

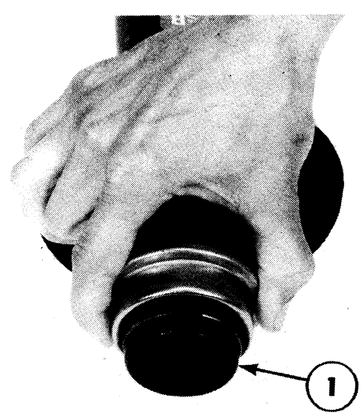


Figure 2-37

A2765-11

Style II is made by Neapco and uses a hard, black plastic slide collar, held in place by a snap ring-type retainer.

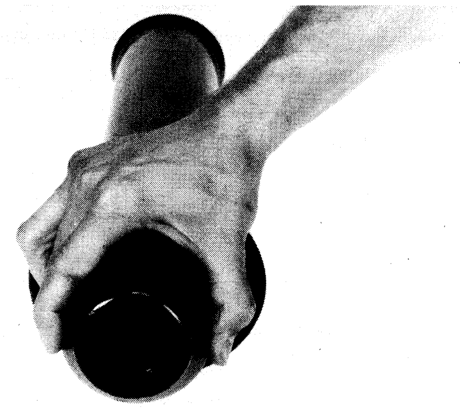


Figure 2-38

A2765-12

With both style disconnects, removal of the retainer will allow complete disassembly of the quick-disconnect system. See Figures 2-39 and 2-40.

INSPECTION

Inspect all components for damage or excessive wear. Replace any part that appears questionable.

NOTE: Damage to yoke, 1, Figure 2-39 or 2-40, will require replacement of the assembly for safety reasons to insure proper fit of related components.

ASSEMBLY

Put a light coating of oil on the internal components and reassemble in the reverse order of the disassembly procedure.

Figure 2-39

A2765-10

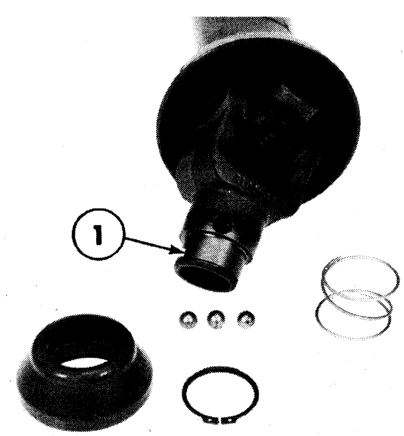


Figure 2-40

A2765-5

SHAFT AND CLUTCH REMOVAL

In order to service the gearbox, slip clutches, or the PTO shear hubs (Model 644 only), the driveline must be removed from the machine to gain access to these areas.

Removal

Model 634

On the Model 634, removal requires that the shield over the gearbox be opened and the slide collar, 1, released.

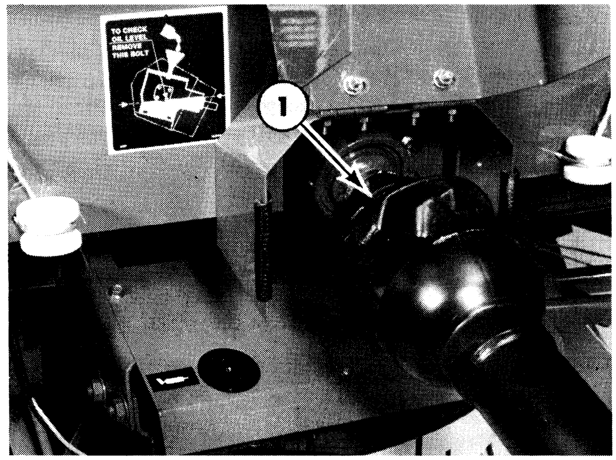


Figure 2-41

A3967-6

Models 644, 654, and 664

Loosen and remove the 1/2″ setscrew and jam nut at the rear PTO yoke at 1 and 2. Remove the rear PTO assembly from the shaft.

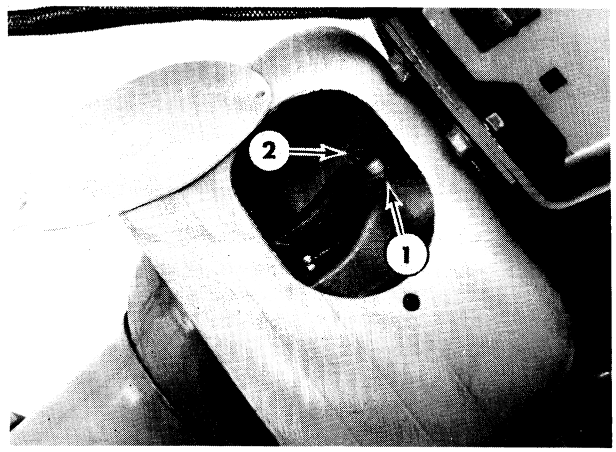


Figure 2-42

2364-5

Remove the cap screws and nuts securing the bearing flangettes to the front bearing support at 3.

The shield ring, shield, bearing, and flangettes can now be removed from the front bearing support.

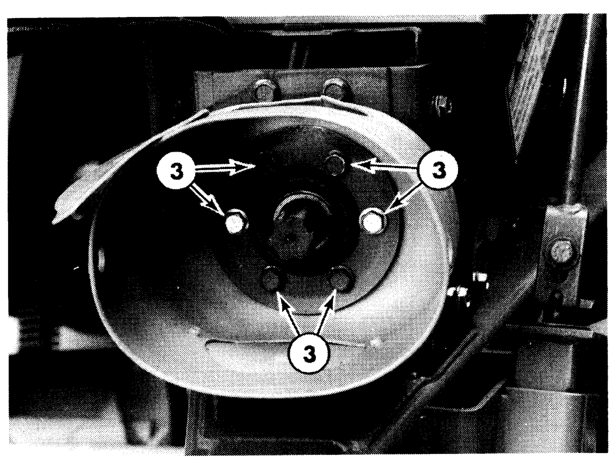


Figure 2-43

2364-12

Remove snap ring, 1, Figure 2-44. The PTO drive shaft can now be removed from the baler. See Figure 2-45.

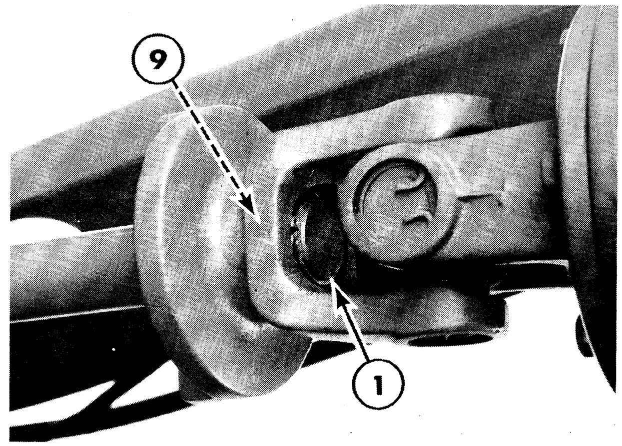


Figure 2-44

2364-11

Figure 2-45 shows the complete PTO drive to the gearbox input shaft on the Models 650 and 660.

1 Power take-off assembly (PTO)
2 Shield ring
3 Shield
4 Front flangette
5 Bearing
6 Rear flangette and support
7 Drive shaft
8 Slip clutch and yoke assembly

NOTE: The Model 644 uses a shear bolt hub assembly in place of the slip clutch assembly.

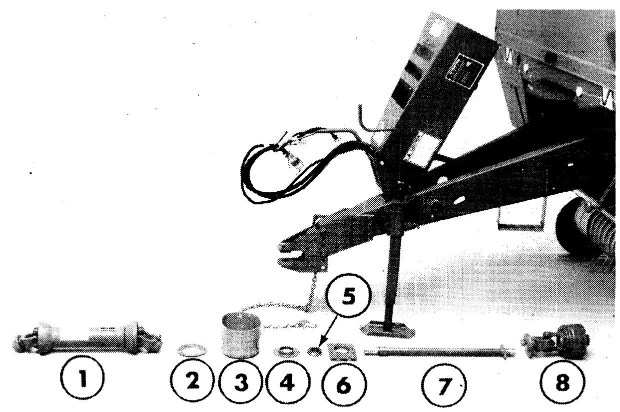


Figure 2-45

2364-9

Inspection

Check bearing, 5, Figure 2-45, for roughness, signs of dryness (no grease), or poor seals. Replace if necessary.

Check the drive hub bushings, 9, Figure 2-44, for wear and replace if necessary.

The bushing used on the Models 654 and 664 is part #37136. The Model 644 uses part #40699.

Assembly

1. The drive hub bushing should turn freely on the shaft surface. It may be necessary to hone the bushing if a tight fit is encountered. Also apply a small coating of grease.
2. Assemble the parts in the reverse order of disassembly.

   Torque the M10 cap screws at 3, Figure 2-43, to 41 ft. lbs. (56 N·m).

NOTE: Apply antiseize to the shaft before installing the rear PTO yoke.

Torque setscrew, 2, Figure 2-42, to 50 ft. lbs. (68 N·m). Using a hammer and punch, rap the head of the setscrew and retorque. Repeat the hammer seating three times and lock the jam nut.

Lubricate the grease fittings with multipurpose grease.

LABOR GUIDE

	HOURS
MODEL 634	
PTO Removal	0.06
Front PTO Shaft Disassembly	0.37
Rear PTO Shaft	0.25
Front & Rear Assembly	1.75
MODELS 644, 654, AND 664	
Removal	0.50
Disassembly	0.37
Assembly	0.50
SLIDE COLLAR	0.25
SHAFT AND CLUTCH REMOVAL	
634	0.06
644, 654, 664	0.37
Assembly	
634	0.06
644, 654, 664	0.50

INDEX

SECTION 3
GEARBOX REMOVAL

This section covers the repair of the 540 RPM gearbox used on the Models 634, 644, 654, and 664 round balers and the 1000 RPM gearbox used on the Model 664 only.

REMOVING THE GEARBOX

Model 634

Open the shield over the rear of the PTO at the gearbox. Move the slide collar on the PTO U-joint, 1, toward the front of the baler to free the U-joint from the gearbox shaft.

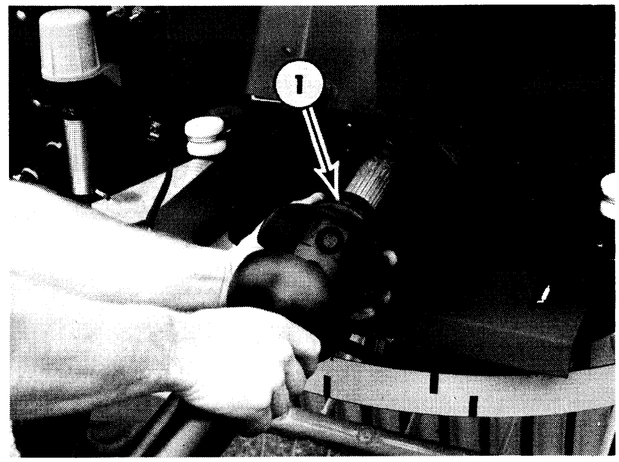


Figure 3-1

A4136-6

Remove the PTO assembly from the baler. Remove the eight cap screws at 2. Loosen the four cap screws securing the gearbox to the frame, noting the location of shims between the gearbox and frame.

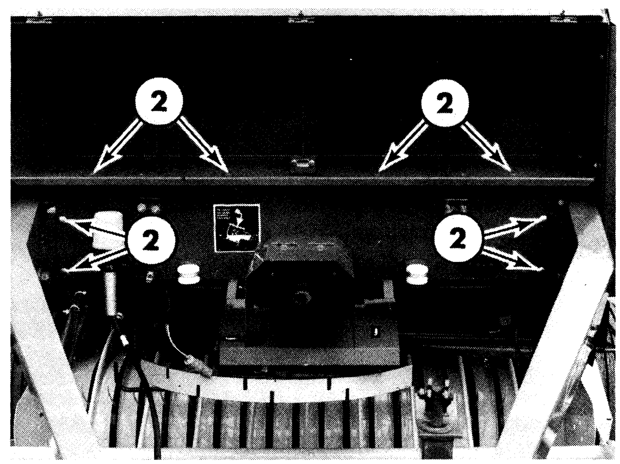


Figure 3-2

A4136-5

Loosen and remove the drive chains from the drive shaft sprockets at 3.

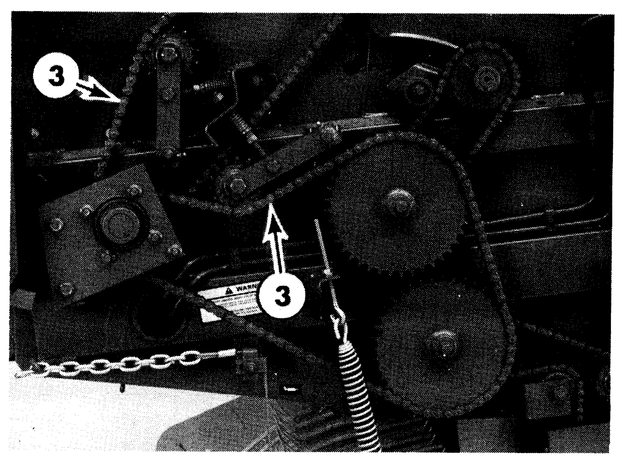


Figure 3-3

1461-8

Shift the gearbox away from the splined output coupler and remove the gearbox.

Figure 3-4

2543-6

Models 644, 654, and 664

Open upper shield accesses and loosen jam nut, 3. Remove setscrew, 2. With a pry bar, remove the rear PTO assembly from the drive shaft.

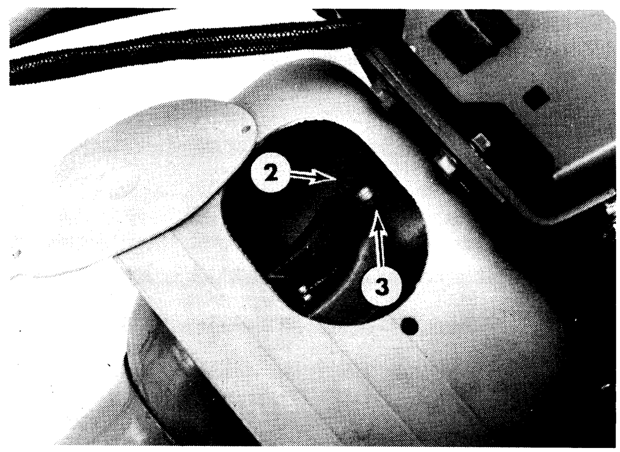


Figure 3-5

2364-5

Remove the cap screws at 1. The entire driveline can now be slid forward to disengage the assembly from the gearbox input shaft. See Figure 3-7.

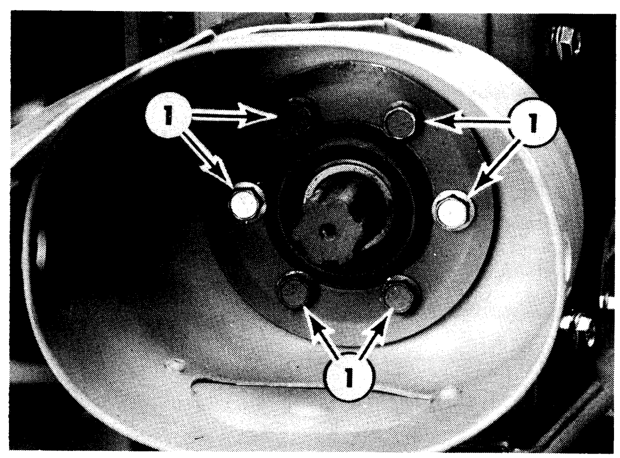


Figure 3-6

2364-12

NOTE: The driveline is shown completely disassembled. For gearbox removal, the assembly can be allowed to slide forward until the front bearing support holds the clutch or the shear bolt assembly without complete teardown.

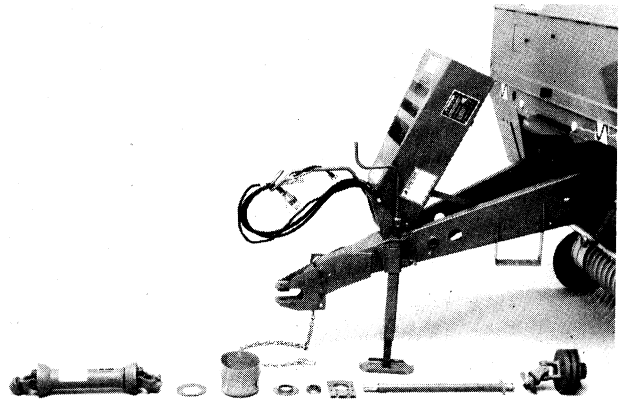


Figure 3-7

2365-4

On the left-hand side, loosen the drive chain spring-loaded idlers at 2. Remove the drive chains from the drive sprocket.

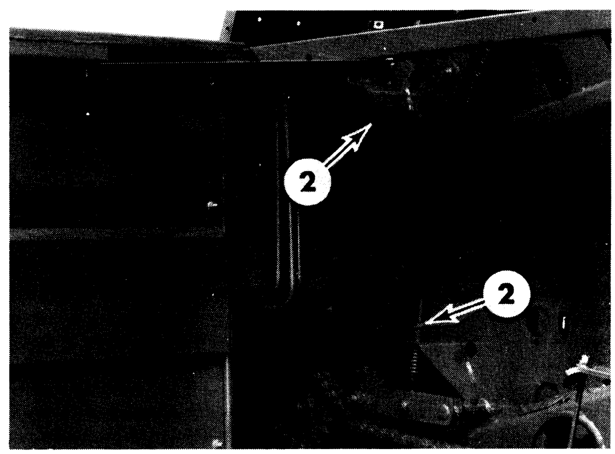


Figure 3-8

A2643-11

NOTE: The removal of the front left corner shielding is not required for gearbox removal; however, access to the hardware is improved.

Remove the four cap screws at 3, and disengage the gearbox from the output splined coupler.

NOTE: Shims are used between the gearbox and mounts for proper output shaft alignment. See 4. Note their location to speed reassembly.

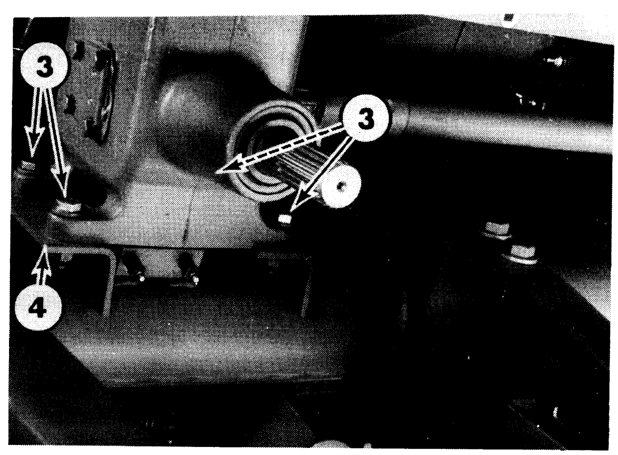


Figure 3-9

2365-2

REBUILDING THE GEARBOX

540 RPM

The 540 RPM gearbox is used on the Models 634, 644, 654, and 664. A different gearbox is used on the 1000 RPM Model 664 only.

Disassembly

Remove cover, 1, and cup, 2.

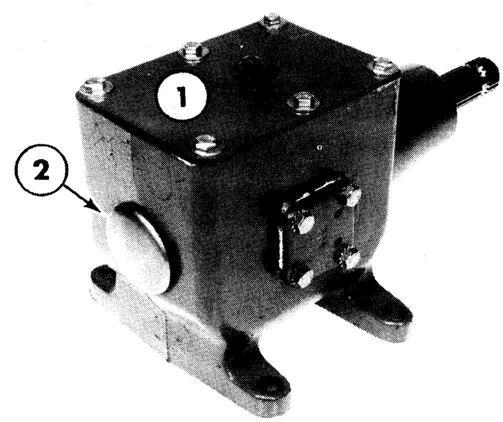


Figure 3-10

A500-3

Remove bearing end cap, 1. Remove and discard crush washer, 2. Press the output shaft, 3, in the direction shown to remove the shaft and bearings from the gearbox.

NOTE: Properly support the gearbox and bevel gear, 4, to avoid damage while pressing out the shaft.

Bevel gear, 4, can now be removed from the gearbox.

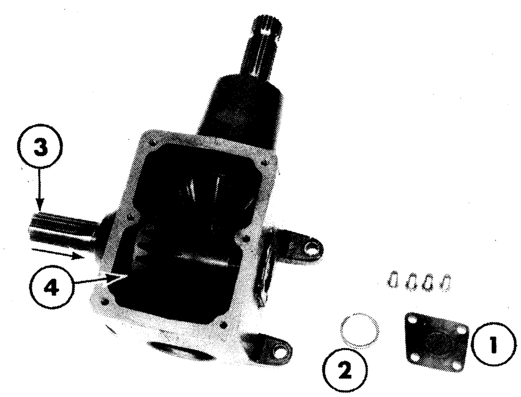


Figure 3-11

A399-9

Remove the cotter pin, nut, and washer at 1. Remove pinion gear, 2, and press input shaft, 3, with bearings out the front of the gearbox.

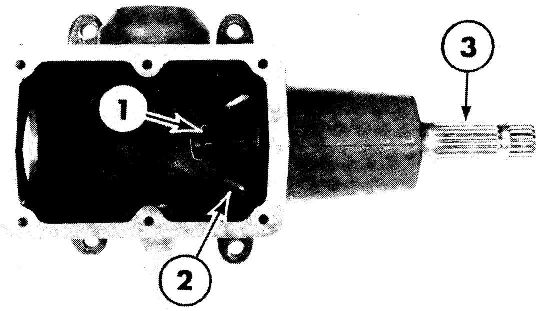


Figure 3-12

A399-11

The bearing cups at 1 and 2 can now be removed.

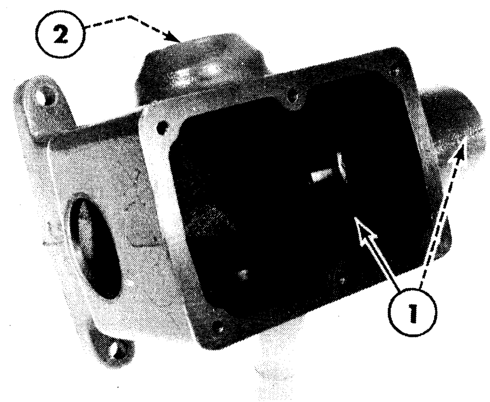


Figure 3-13

A399-12

Figure 3-14 shows a layout of the parts in the gearbox.

Inspection

Inspection of all gears and bearings is necessary. If rough spots or worn areas are found, replace the parts. Always install new seals when overhauling the gearbox.

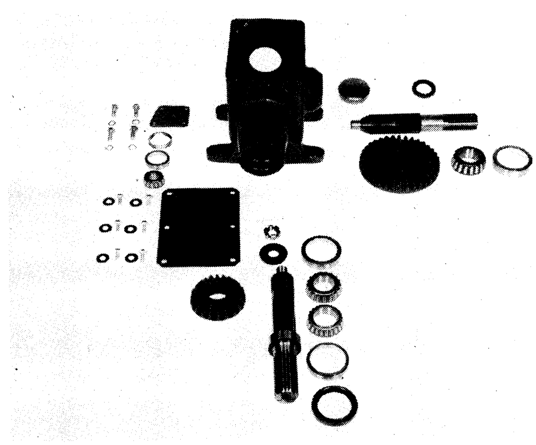


Figure 3-14

A399-6

Assembly

Install bearing cups at 1 and 2. Be sure the cups are seated against the shoulders in the gearbox.

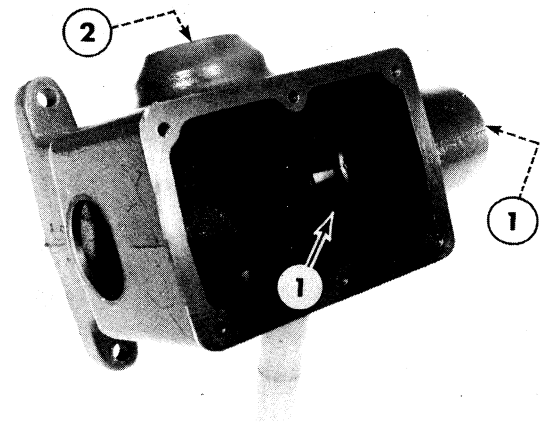


Figure 3-15

A399-12

Install input shaft and bearings, 1; pinion gear, 2; and washer and nut, 3. Tighten the nut until the preload on the bearings is 0 to 4 in. lbs. rolling torque with no end play. After the preload is set, install the cotter pin at 3 and the seal at 4.

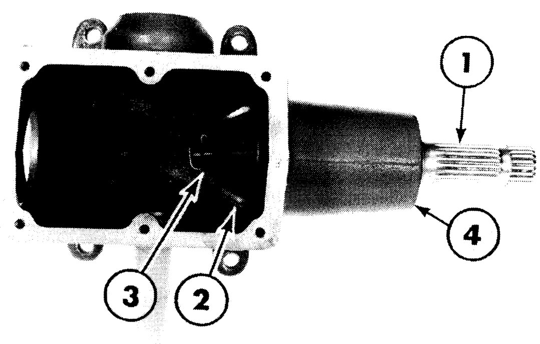


Figure 3-16

A399-11

INPUT BRG. PRELOAD (IN LBS)	OUTPUT SHAFT BEARING PRELOAD (IN LBS)				
	0	1	2	3	4
0	0	1	2	3	4
1	2	3	4	5	6
2	4	5	6	7	8
3	5	6	7	8	9
4	7	8	9	10	11

OUTPUT SHAFT TORQUE

6

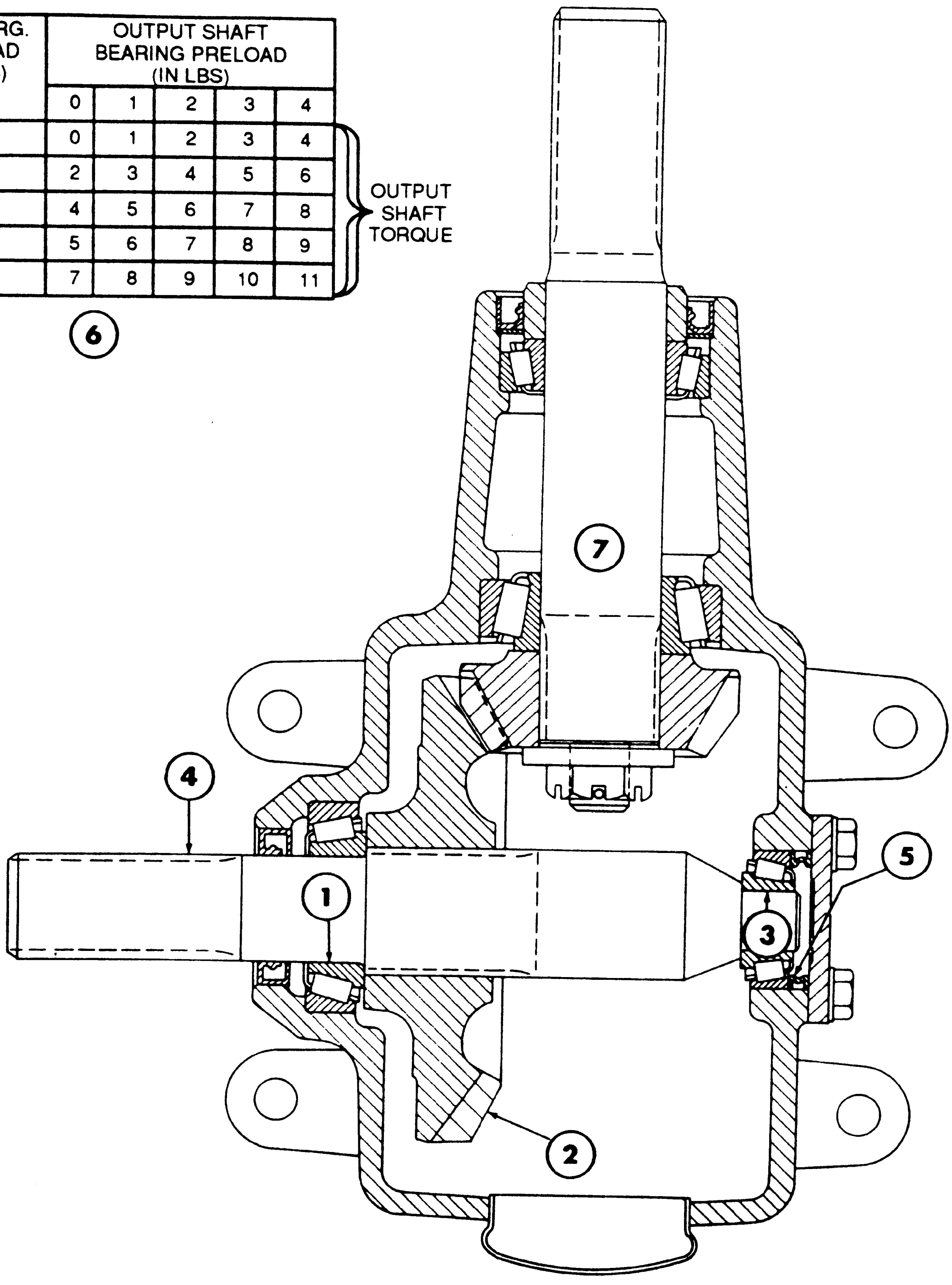


Figure 3-17

Place bearing cone, 1, and bevel gear, 2, in the gearbox housing. Install bearing cup and cone, 3, on the output shaft, 4, and slide the shaft through gear, 2, and bearing, 1. Install enough shims at 5 in place of discarded crush washer, 2, Figure 3-11, to obtain 0 - 4 in. lbs. of rolling torque with no end play on shaft, 4. Chart, 6, must be used to add the bearing preload of the input shaft, obtained in Figure 3-16, to the output shaft bearing preload.

Example:

If the input shaft preload was 2 in. lbs. and the torque reading on the output shaft was 6 in. lbs., then the preload on the output shaft bearings would be 2 in. lbs.

After the output shaft bearing preload has been set, apply #2 Permatex sealer on cover, 1, and on the threads of bolts, 2. Place a small bead of #2 Permatex sealer on the lip of cap, 3, and install the cap in the gearbox housing.

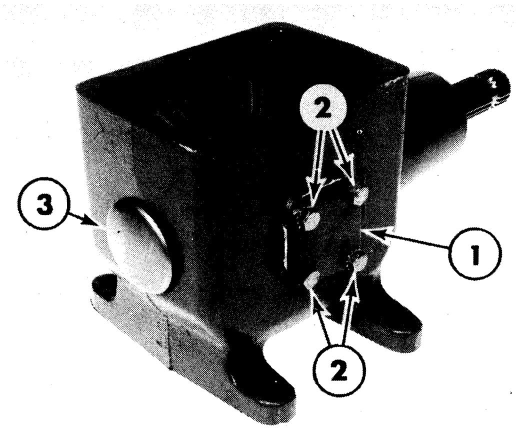


Figure 3-18

A500-4

Install cover, 1, using #2 Permatex sealer between the cover and gearbox housing. After installation, fill the gearbox with 80W-90 GL5 lubricant to the level specified in the operator's manual.

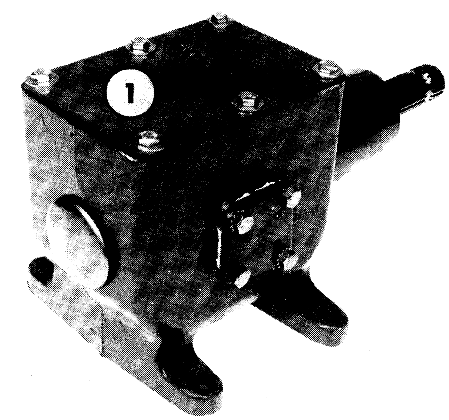


Figure 3-19

A500-3

1000 RPM

The Model 664 is the only model which, from the factory, can be ordered with 1000 RPM drive.

Disassembly

Remove cover, 1, and drain the oil from the gearbox.

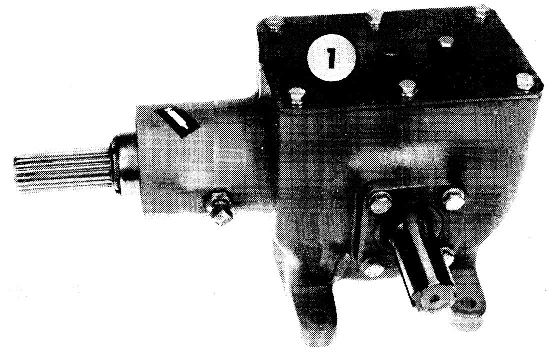


Figure 3-20

A541-6

Remove cap, 1, and loosen nut, 2. Remove bearing cap, 3, and remove output shaft and bearings, 4. Remove drive gear, 5.

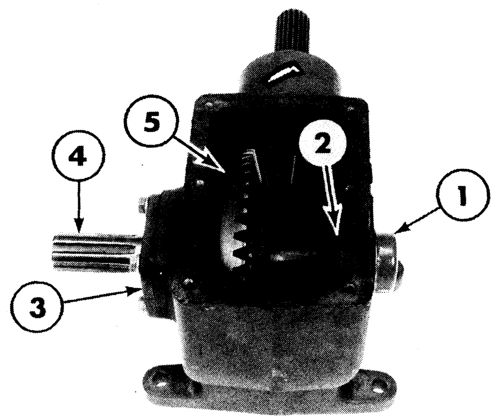


Figure 3-21

A541-7

Remove setscrew, 1. Slide the input shaft and bearing assembly out of the gearbox.

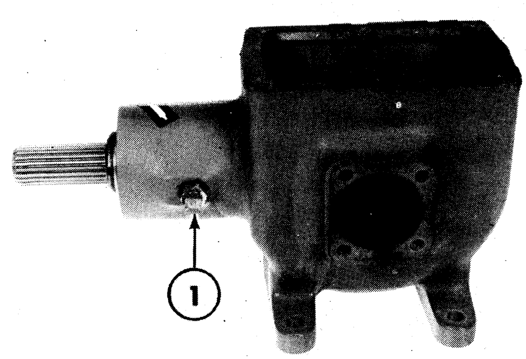


Figure 3-22

A540-11

Remove nut, 1, from the input shaft. Bearings, 2, and spacer, 3, can now be pressed off the shaft.

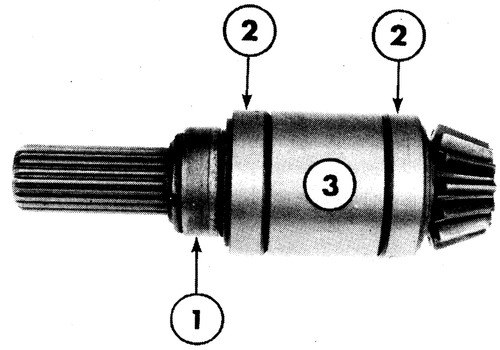


Figure 3-23

A540-10

Press bearings, 1, from the output shafts. Remove nut, 2, from the output shaft.

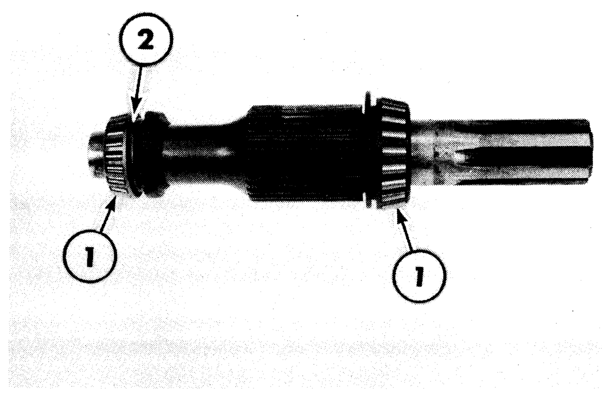


Figure 3-24

A540-9

Figure 3-25 shows a layout of the parts in the gearbox.

Inspection

Inspection of all the gears and bearings is necessary. If rough spots or worn areas are found, replace the parts. Always install new seals when overhauling the gearbox.

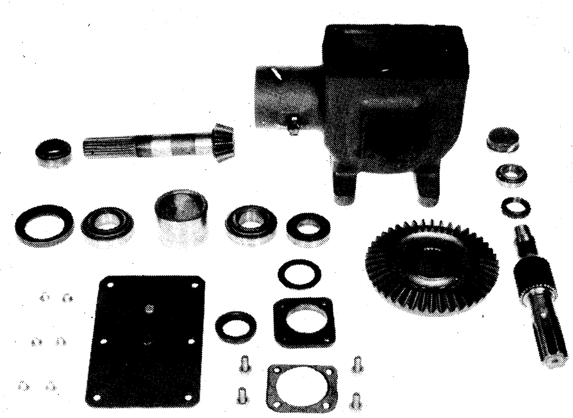


Figure 3-25

A540-7

Assembly

Install bearings, 1; spacer, 2; and nut, 3; on the input shaft, 4.

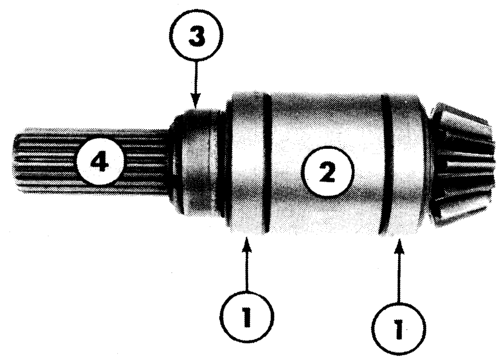


Figure 3-26

A540-10

Install the input shaft and bearings in the gearbox and tighten setscrew, 1, against spacer, 2, Figure 3-26. Tighten nut, 3, until the preload on the bearings is 2 in. lbs. - 6 in. lbs. of rolling torque without the seal. Loosen setscrew, 1, and slide the input shaft forward.

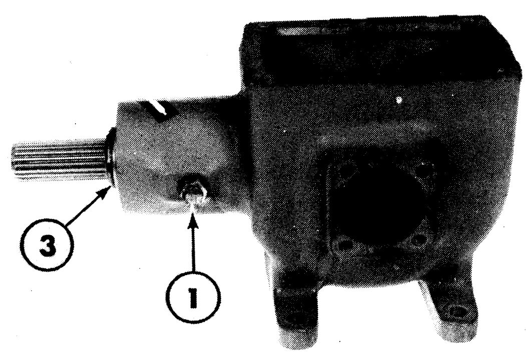


Figure 3-27

A540-11

Install bearing cups, 1 and 2, in the gearbox housing.

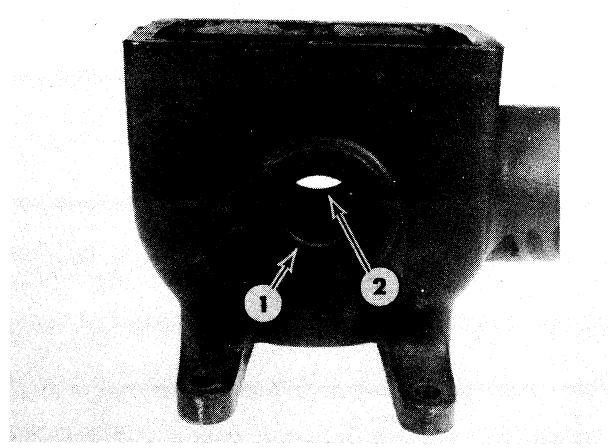


Figure 3-28

A541-4

Install nut, 1; washers, 2; and bearings, 3; on the output shaft.

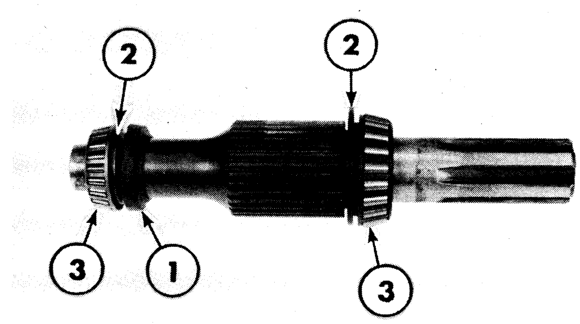


Figure 3-29

A540-9

Install gear, 1, and output shaft, 2, in the gearbox housing. Install bearing cap, 3, with the same shims that were removed at disassembly at 4. Tighten nut, 5, until the preload on the bearings is 2 in. lbs. - 6 in. lbs. of rolling torque without the seal. Stake nut, 5, to the shaft at the slot in the shaft.

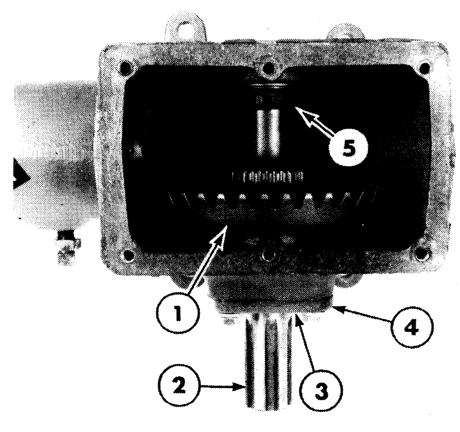


Figure 3-30

A541-3

Slide input shaft, 1, back until 0.005″-0.014″ backlash is obtained between pinion, 2, and gear, 3. Tighten setscrew, 4, to 65 ft. lbs. (88 N·m) and tighten the jam nut.

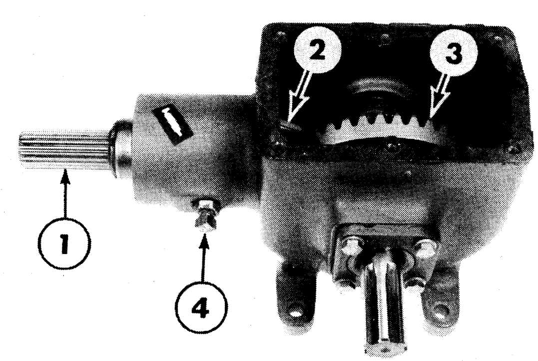


Figure 3-31

A541-8

Install cap, 1, using #2 Permatex as a sealer between the cap and the gearbox.

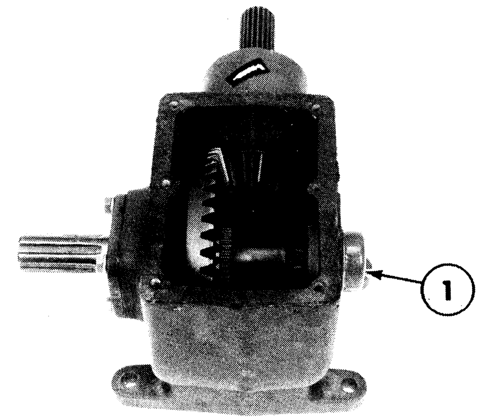


Figure 3-32

A541-7

Install new seals at 1.

Install cover using #2 Permatex between the cover and housing.

After installation on the baler, fill the gearbox to the level specified in the operator's manual with 80W90 GL5 lubricant.

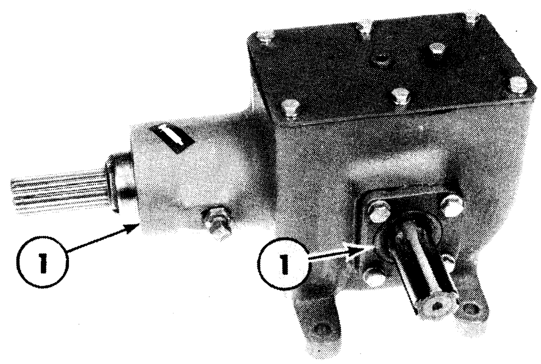


Figure 3-33

A541-6

INSTALLING THE GEARBOX

Model 634

Inspect the drive shaft coupler for excessive wear. Replace the shaft, if required.

Apply antiseize grease on the gearbox output shaft. Install the gearbox on the main frame mounts at the same time you engage the output shaft into the coupler. Replace the shims between the frame mounts and the gearbox in the same location as previously removed. Install the cap screw snugly (not tight).

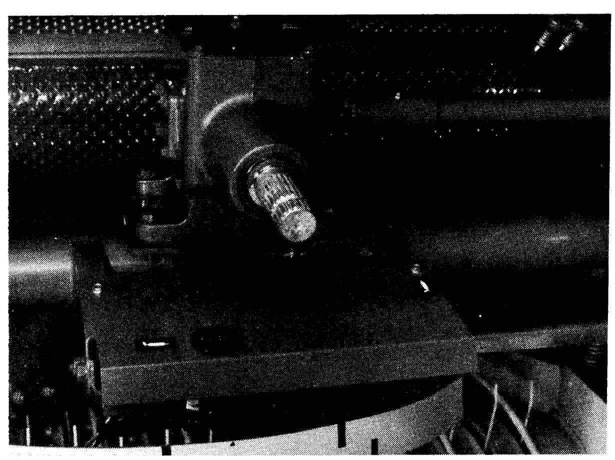


Figure 3-34

A2543-7

NOTE: If the gearbox housing is not the same as previously removed, do not install shims at this time. Loosen and remove the lock collar from the drive shaft bearing at 1.

Rotate the gearbox input shaft to check for tight spots between the gearbox shaft and drive shaft coupling. If tight spots are found, loosen the gearbox and add shims where necessary. Snug cap screws and repeat. When properly located, the gearbox shaft should rotate freely through a 360° rotation. Loosen the hardware and tilt the gearbox up to add the shield previously removed. See Figure 3-2. Torque the M12 hardware to 72 ft. lbs. (97 N·m). Replace the shield hardware at 2, Figure 3-2, and install the PTO assembly on the gearbox input shaft. Replace the drive chains and adjust to 1-5/8″ (41 mm) spring compression.

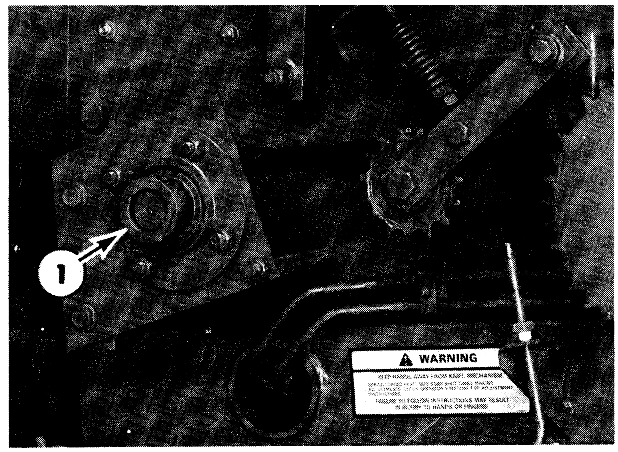


Figure 3-35

A2564-9

Models 644, 654, 664

Inspect the drive shaft coupler, 1, for excessive wear. Replace the shaft if required.

Apply antiseize grease on the gearbox output shaft. Install the gearbox on the main frame mounts and, at the same time, engage the output shaft into the coupler. Replace the shims between the frame mounts and the gearbox in the same location as previously removed, 2. Install the cap screws, hardened washers, and nuts previously removed. Tighten the hardware snugly (not completely tight).

NOTE: If the gearbox housing is not the original, do not install shims at this time.

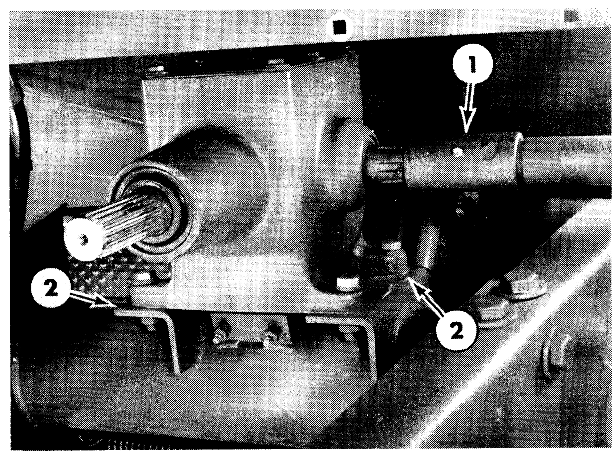


Figure 3-36

2365-3

Loosen the drive shaft lock collar at 3.

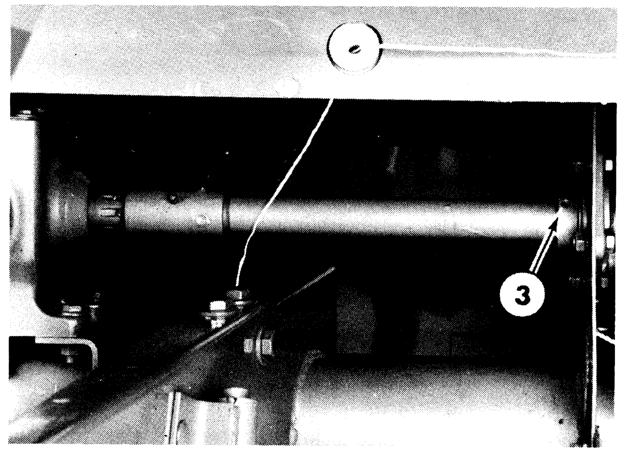


Figure 3-37

1789-10

Rotate the gearbox input shaft to check for tight spots between the gearbox output shaft and the shaft coupling. If tight spots are found, loosen the gearbox and add shims where required. Snug the gearbox hardware and repeat. When properly aligned and shimmed, the gearbox output shaft should rotate freely through a 360° rotation. Torque the M12 hardware to 72 ft. lbs. (97 N·m). Reinstall the drive chains and tension to the dimension shown.

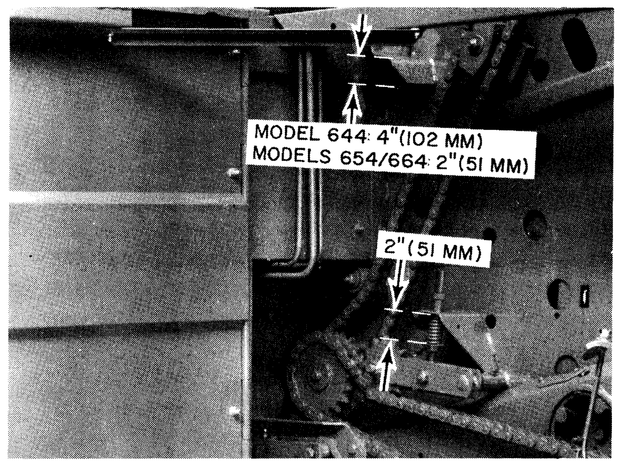


Figure 3-38

A2543-11

Reassemble the PTO driveline in the reverse order of disassembly. Add antiseize grease to the gearbox input shaft before installing the slip clutch assembly or shear hub.

Torque the M10 cap screws, 1, to 41 ft. lbs. (56 N·m).

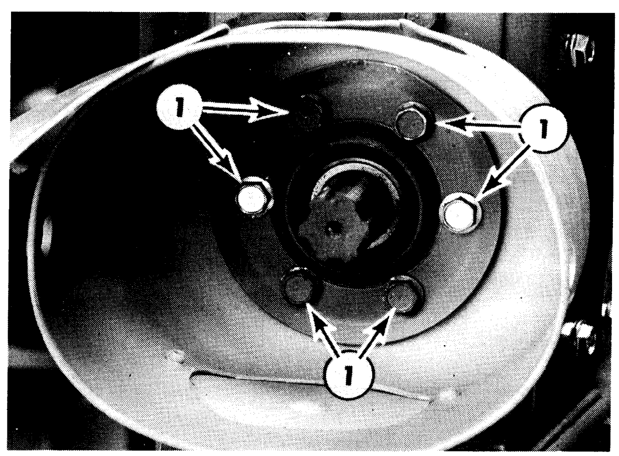


Figure 3-39

2364-12

Apply antiseize to the PTO shaft before installing the rear PTO yoke.

Torque setscrew, 1, to 50 ft. lbs. (68 N·m). Using a hammer and punch, rap the head of the setscrew and retorque. Repeat the hammer seating three times and lock the jam nut.

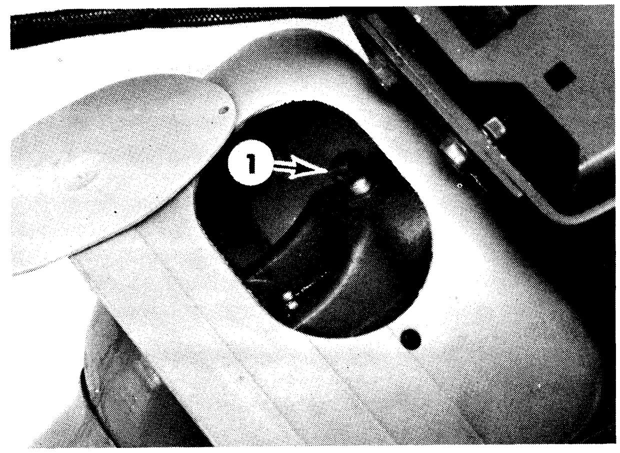


Figure 3-40

A2364-5

LABOR GUIDE

	HOURS
GEARBOX REMOVAL	
Model 634	0.30
Models 644, 654, 664	0.75
GEARBOX REBUILD	
540 RPM	2.25
1000 RPM	2.25
GEARBOX INSTALLATION	
Model 634	0.50
Models 644, 654, 664	1.00

INDEX

SECTION 4
STANDARD AND WIDE PICKUPS

This section covers the normal maintenance and repair, as well as complete rebuild, of the standard and wide pickups.

STANDARD PICKUP

FINGER REPLACEMENT

To replace a damaged finger, remove the M6 x 12 cap screws securing the guard to the frame over the appropriate finger.

Angle Bar Design

Remove the M10 cap screw, securing the damaged finger to tine angle. Replace the finger and reinstall the cap screw and M10 locknut. Locate loop, 1, in the finger, under the head of the cap screw, as shown, and tighten the locknut.

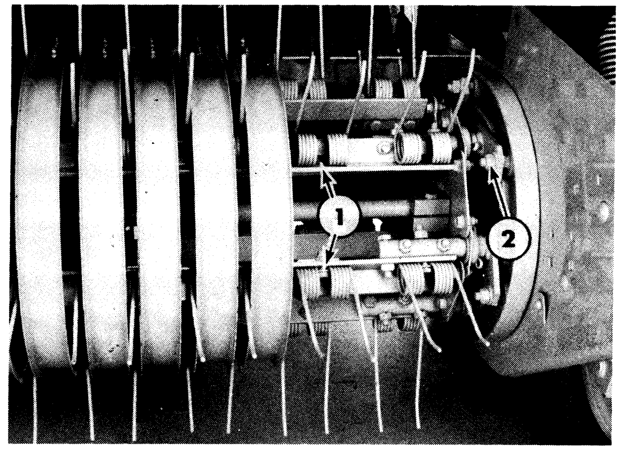


Figure 4-1

A1062-10

Tooth Pipe Design

Remove the special cap screw, securing the damaged finger to the tooth pipe. Install the new finger with the tooth bracket, 1, spacer, 2, and special cap screw. Torque the 5/16″ locknut, 3, to 176 in. lbs. (20 N·m).

Replace the guard and M6 self-tapping cap screws. Torque guard cap screws are not to exceed 102 in. lbs. (12 N·m).

NOTE: Rotate the pickup reel to insure fingers do not contact the guards at any time.

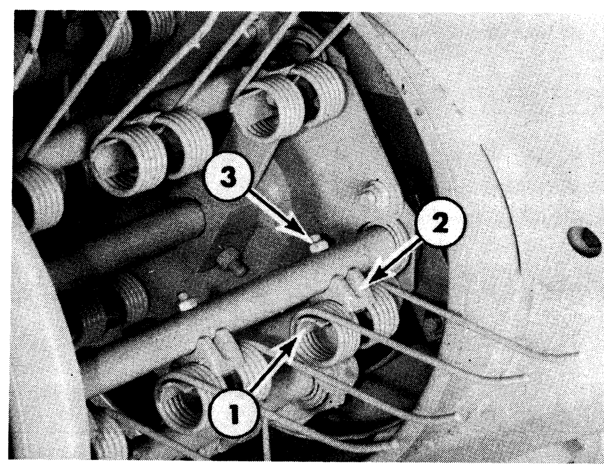


Figure 4-2

A3982-10

CAM BEARING REPLACEMENT

To replace a cam bearing, remove two guards on the left-hand end of the pickup. Remove the shield covering the pickup drive. Rotate the pickup reel until the failed bearing is shown at 1.

From the inside, remove the cam bearing locknut at 2, Figure 4-1.

Remove the failed bearing through the access hole shown. Replace with a new bearing, reversing the disassembly. Torque the nut to 83 ft. lbs. (113 N·m). Repeat for each bearing requiring replacement. Reinstall the guards and tighten the self-tapping screws to 102 in. lbs. (12 N·m). Be sure the guards are centered between the fingers. Replace the shield over the drive clutch.

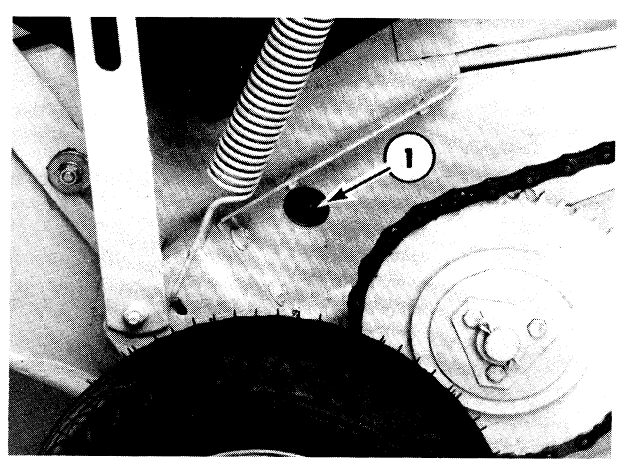


Figure 4-3

A2375-7

SLIP CLUTCH REPAIR

Remove the shield on the left-hand side covering the pickup drive. Loosen idler block, 1, and remove drive chain, 2.

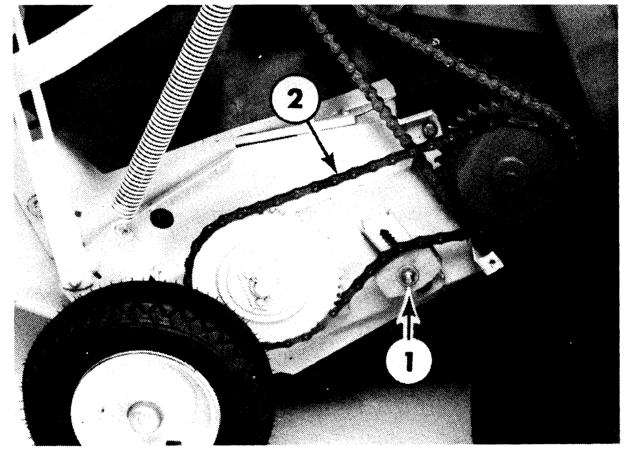


Figure 4-4

A2375-10

Remove cotter pin, 3, spacer washers, and cap screw retainer, 4.

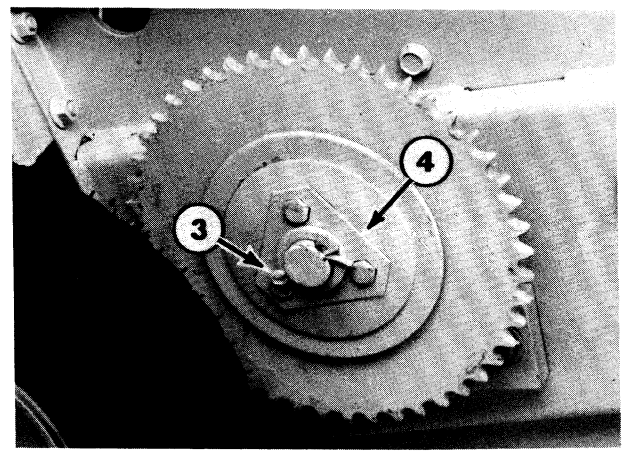


Figure 4-5

A2379-4

Remove the three cap screws at 5, and separate the components from the hub.

NOTE: Removal of the clutch assembly was done for clarity.

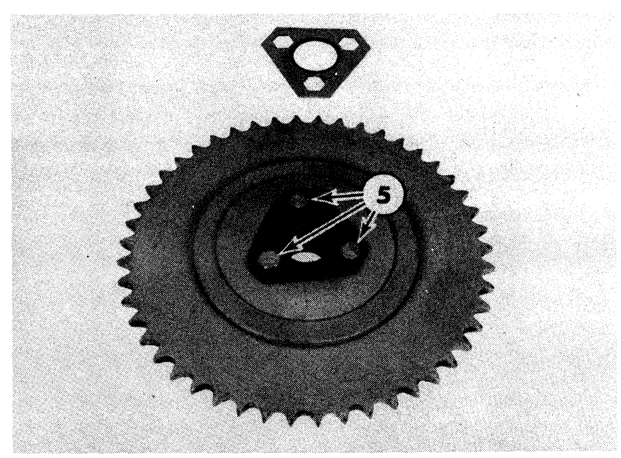


Figure 4-6

A2379-8

Examine the surface of components 7, 9, and 10 in the area which contacts friction disc, 8. If the surfaces are rusted or pitted, use 80-100 grit emery paper to polish these areas.

Inspect the two friction discs, 8. If they are grooved and worn, they should be replaced. Inspect the spring washer, 6, for crackage or deformation. Replace if necessary.

Reassemble the clutch and torque the three cap screws to 120 in. lbs. (13 N·m) each initial torque.

Install the drive chain, 2, Figure 4-4, and adjust idler block, 1, to allow 3/16″ - 1/2″ (5 mm -13 mm) free travel on the upper strand.

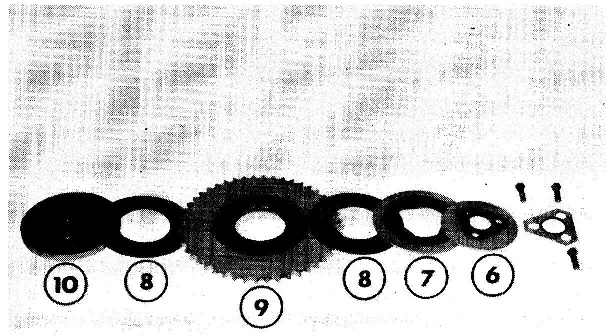


Figure 4-7

A2379-1

Lock up the drive chain by lacing wire or a long cap screw through the upper and lower strand of chain. Using a flat bar between the pickup guards, as shown, with a spring scale, check the tension of the clutch. When properly adjusted, the pickup should slip at 2800 in. lbs. (316 N·m). The three cap screws must be adjusted evenly.

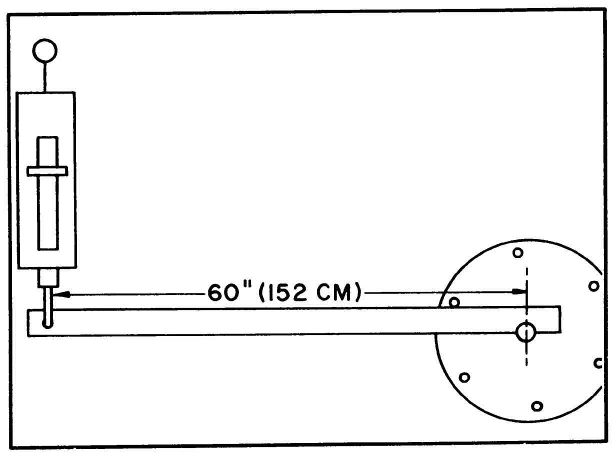


Figure 4-8

A simple procedure for determining the correct spring scale force:

$$\frac{\text{in. lbs. required (N·m)}}{\text{length of bar}} = \text{lbs. (kg) pull on scale}$$

Example:

$$\frac{\text{2800 in. lbs. (1038 N·m)}}{60'' \text{ (152 cm)}} = \text{47 lbs. (21 kg)}$$

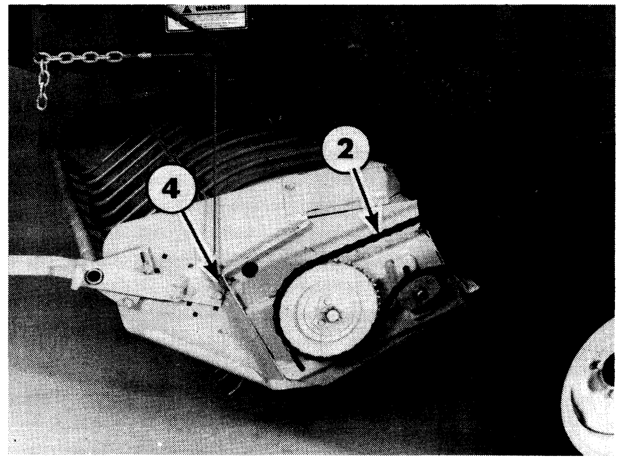
After final adjustment, install the cap screw retainer, 4, spacer washers, and cotter pin, 3, Figure 4-5.

Remove the locking device from the drive chain and install the pickup shield.

MODELS 634, 644, 654, AND 664

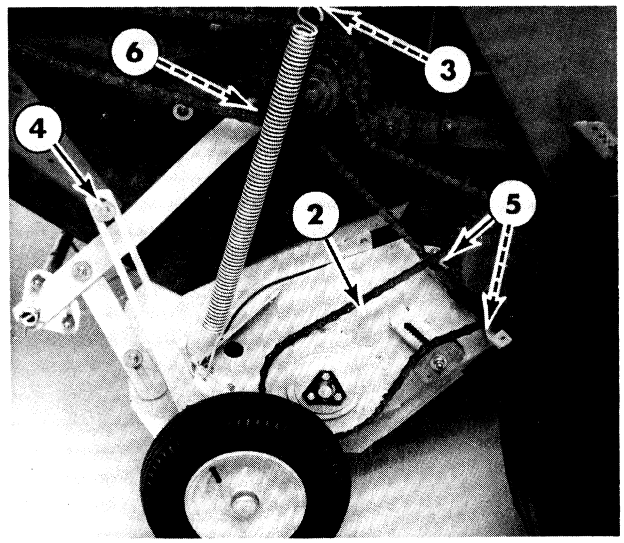
REMOVAL OF PICKUP FROM BALER

1. Remove the shield and drive chain, 2, from the left-hand side of the baler. See Figures 4-9 and 4-10.



A3968-7

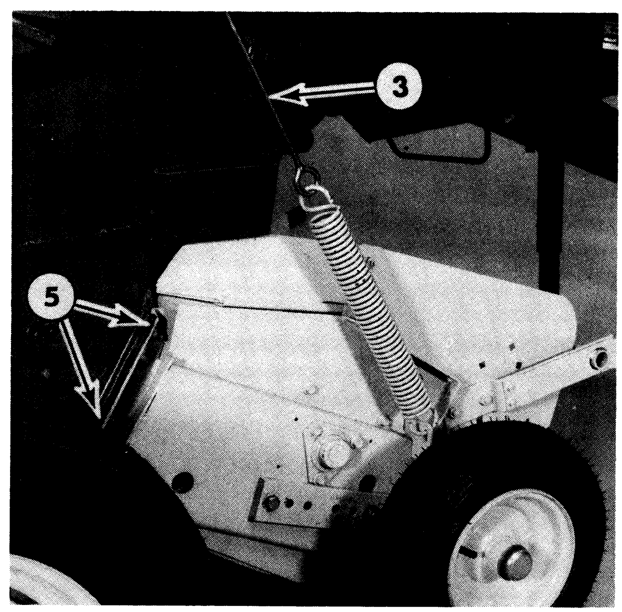
Figure 4-9



A4105-4

Figure 4-10

2. Loosen and remove the flotation springs from each side of the baler at 3, Figures 4-10 and 4-11.



A3967-4

Figure 4-11

3. Lower the pickup to field operating position. Disconnect the lift cable at 4, Figure 4-9, on the Model 634. On larger models, disconnect the lift link at 4, and the wind guard link at 6, Figure 4-10. With a floor jack, support the rear of the pickup. Loosen and remove the cap screws at 5, Figures 4-9 through 4-12. The pickup can now be removed from the baler. See Figure 4-13.

   NOTE: The hardened flat washers on cap screws, 5, are positioned for optimum clamping. Note their location for reassembly.

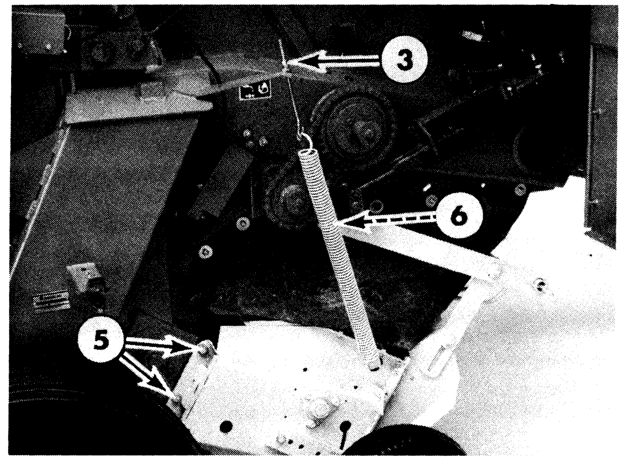


Figure 4-12

A1489-4

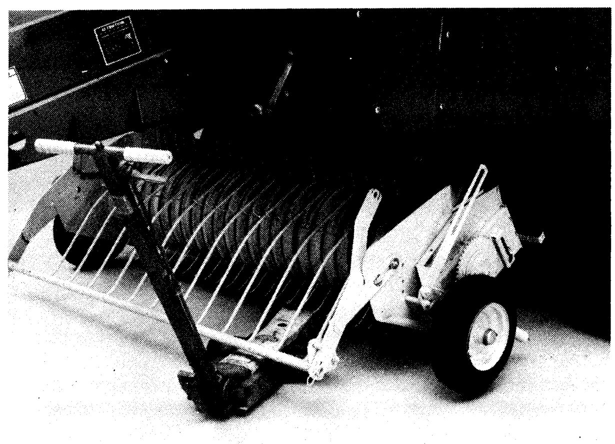


Figure 4-13

A3972-13

CAM TRACK REPLACEMENT

NOTE: Photos show cam replacement for the angle bar design. Replacement of the tooth pipe style units is similar with the addition of a center support.

To obtain better access to the pickup, removal of the complete assembly is recommended. See "Removal of Pickup from Baler" earlier in this section.

With the pickup off the baler, remove cotter pin, 1, and washer, 2, from the left-hand end of the pickup.

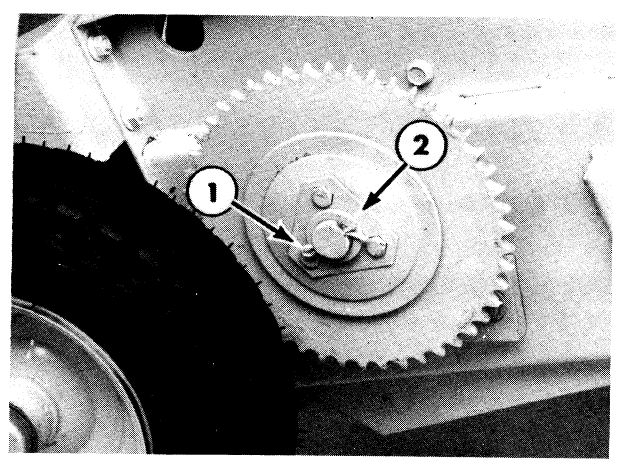


Figure 4-14

A2379-4

Remove the slip clutch assembly from the reel shaft.

Remove woodruff key, 3; washer, 4; and lock collar, 5, from the left-hand end of the reel shaft.

Remove the three cap screws securing the bearing flangette at 6. Remove the bearing and flangettes from the shaft.

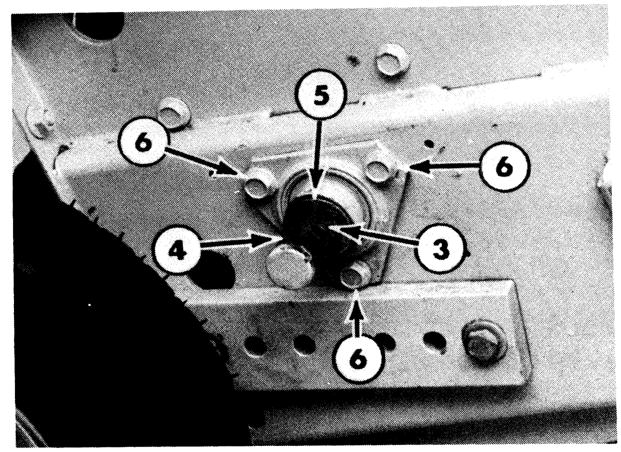


Figure 4-15

A2379-3

On the right-hand end, remove the bearing lock collar, 7, and the cap screws securing the bearing and flangettes at 8.

Remove the bearing and flangettes from the reel shaft.

Pivot the pickup assembly rearward until it stands vertical on the backbone of the frame.

Remove all guards from between the pickup fingers, including the wide guards at each end.

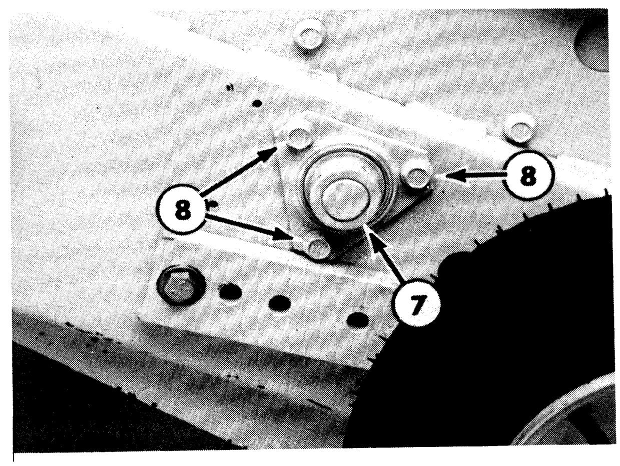


Figure 4-16

A2378-9

Remove the clamp bolts at 9, from each finger disc weld assembly.

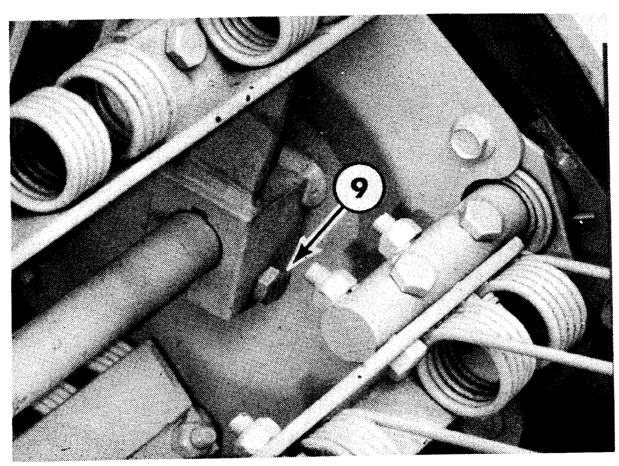


Figure 4-17

A2379-7

Clean the shaft around the finger disc area. Using a dead-blow sledge hammer or other means to protect the shaft, drive the left-hand end of the shaft to the right until the shaft will clear the cam track. Shift the reel assembly to gain access to the cam track hardware. Remove the three M10 x 30 cap screws, 10, securing the cam and discard worn cam and bearing components.

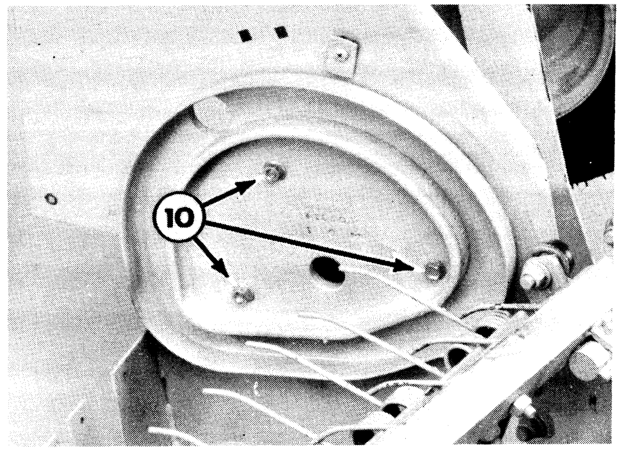


Figure 4-18

A2379-6

ASSEMBLY

Install the cam components as shown. Tighten the three cap screws to 41 ft. lbs. (56 N·m). Reposition the reel assembly and drive the shaft back through the cam and main frame.

NOTE: If repair is being performed by one person, removal of the cam bearings will speed installation.

Align each tine bar and bearing in the cam track.

Replace the bearing and flangette on each end of the shaft at 6 and 8, Figures 4-15 and 4-16.

Torque the cap screws to 41 ft. lbs. (56 N·m).

Rotate the reel assembly to ensure the reel is assembled correctly and that the cam bearings are making full contact with the cam track. Replace the two M10 x 60 cap screws and nuts at 9, Figure 4-17. Torque to 41 ft. lbs. (56 N·m).

Replace the lock collars on each shaft support bearing. Be sure to lock the collar in the direction of pickup rotation. On the left-hand end, replace the slip clutch assembly. Replace the guards and M6 self-tapping cap screws. Tighten the cap screws, not to exceed 12 ft. lbs. (16 N·m).

NOTE: Rotate the pickup reel to ensure the fingers do not contact the guards at any time.

INSTALLATION OF STANDARD PICKUP ASSEMBLY TO BALER FRAME

Position the pickup assembly back to align the frame mounts. Using a floor jack, raise the rear of the pickup to align with the frame attaching mounts and secure with cap screws at 5, Figures 4-8 through 4-12. Torque the M12 cap screws and nuts to 72 ft. lbs. (97 N·m).

Reinstall the pickup lift linkage at 4, Figure 4-9 or 4-10. Raise the pickup and install the flotation springs to each side. Adjust the flotation springs, 3, Figures 4-10 and 4-11, evenly on each side, until there is 50 lbs. (23 kg) weight on the gauge wheels when they are resting on the ground.

Reinstall the wind guard linkage and the pickup drive chain. Adjust the drive idler, Figure 4-19, to provide 3/16″ - 1/2″ (5 mm - 13 mm) sag as shown.

Replace the pickup drive shield.

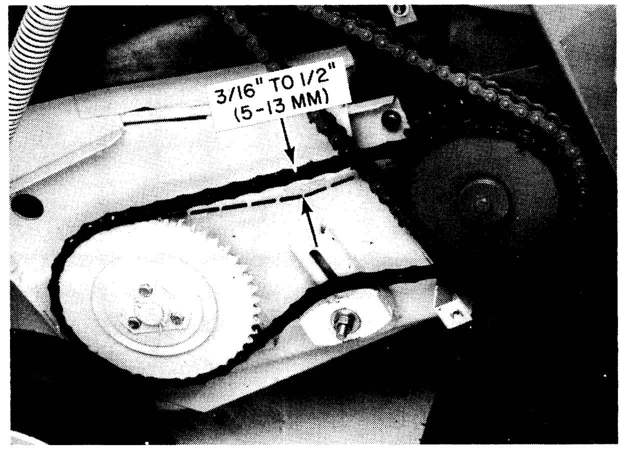


Figure 4-19

A1057-6

WIDE PICKUP

FINGER REPLACEMENT

Figure 4-20 shows the attachment of the pickup finger to the angle weld assembly and the shaft weld assembly on the left-hand end.

To replace a damaged finger on the angle weld assembly, remove the cap screws securing the guard to the frame over the appropriate finger.

Remove the M10 cap screw securing the damaged finger to the angle weld assembly.

Replace the finger and reinstall the cap screw, washer, and locknut. Locate the loop in the finger under the washer and against the cap screw. Tighten the locknut to 41 ft. lbs. (56 N·m).

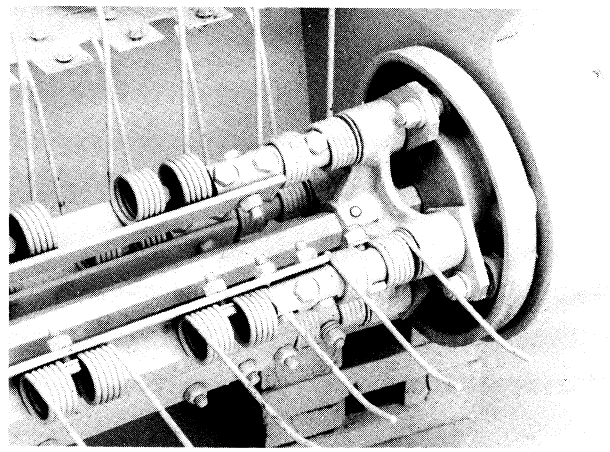


Figure 4-20

2382-2

To replace a finger on the left-hand end requires removal of the last three guards for access to the shaft hardware.

Remove the M10 locknut from the damaged tine and the three M10 x 50 cap screws securing the shaft to the angle weld assembly. See 1.

Position the angle weld assembly away from the shaft to allow removal of the damaged finger. Replace the finger and install the cap screw as shown with the washer and locknut under the loop of the finger, as shown at 2. Replace the three cap screws at 1, and torque the hardware to 41 ft. lbs. (56 N·m).

Replace the guard and M6 self-tapping cap screws. Torque cap screws not to exceed 102 in. lbs. (12 N·m).

NOTE: Rotate the pickup reel to ensure that the fingers do not contact the guards at any time.

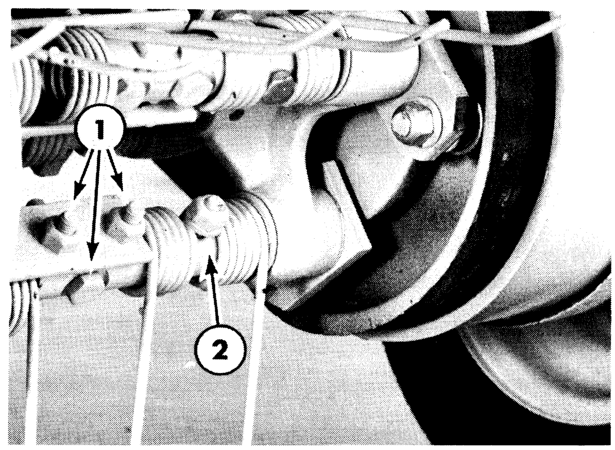


Figure 4-21

2379-11

CAM BEARING REPLACEMENT

To replace a cam bearing, remove the pickup wheel and shield on the left-hand end of the pickup. Loosen and remove the auger drive chain. Rotate the pickup reel until the failed bearing is visible in the hole at 3. Remove the cotter pin, washers, and sprocket at 4.

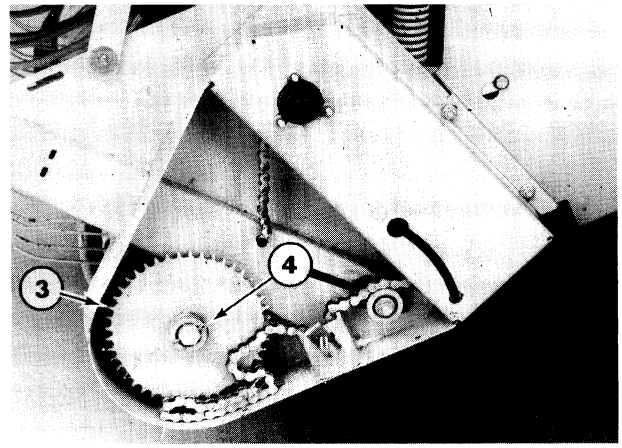


Figure 4-22

2380-7

Remove the last two guards from the left-hand end. Remove the cam bearing locknut at 5.

Remove the failed bearing through the access hole.

Replace with a new bearing, reversing the disassembly. Torque the nut to 83 ft. lbs. (113 N·m). Repeat for each bearing requiring replacement. Reinstall the guards and tighten the self-tapping screws to 12 ft. lbs. Be sure the guards are centered between the fingers.

Replace the sprocket at 4, Figure 4-21, and install the auger drive chain. Adjust the auger drive chain, Figure 4-23, to have 3/16″ - 3/4″ (5 mm - 20 mm) deflection as shown.

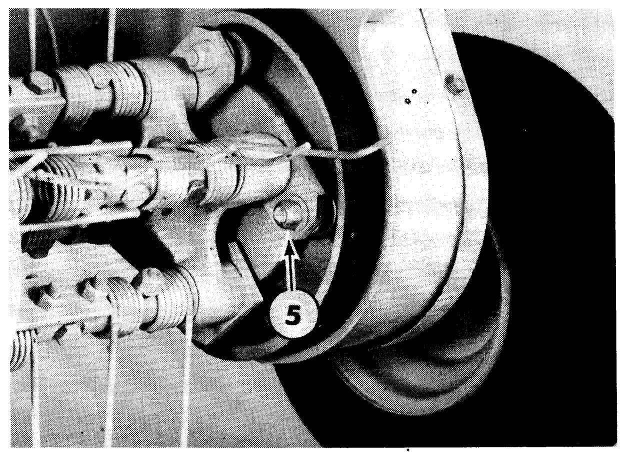


Figure 4-23

2379-11

AUGER REPAIR

Repair of a damaged auger, bearings, or drive chain is identical for either side. Disassemble only to the extent necessary to make the needed repair.

Loosen and remove the pickup wheel and auger drive shield, as shown. Remove the bearing shield at 6.

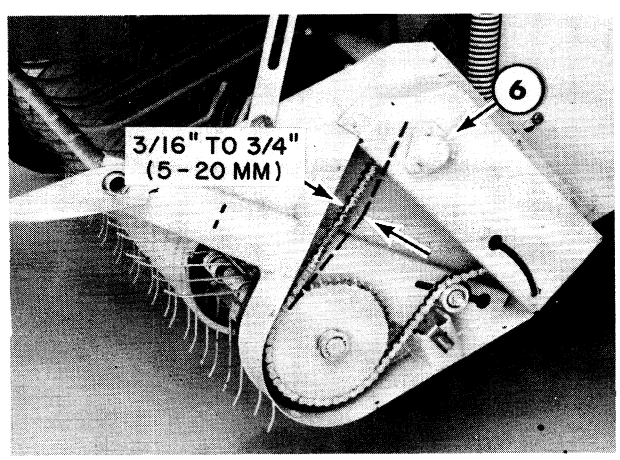


Figure 4-24

2379-10

Loosen and remove the connector link from the auger drive chain. Remove the bearing flangette hardware at 1, and support hardware at 2. Remove the bearing support assembly.

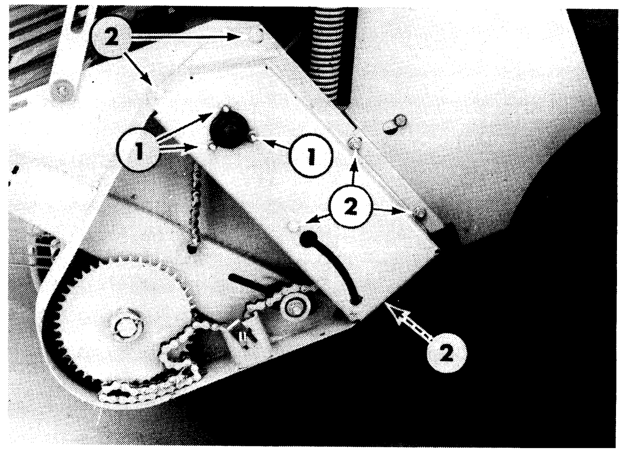


Figure 4-25

2380-6

Loosen and remove the lock collar, 1; bearing, 2; flangette, 3; and driven sprocket, 4; from the auger shaft.

Remove the inner bearing lock collar at 5. From the inside, remove the auger weld assembly.

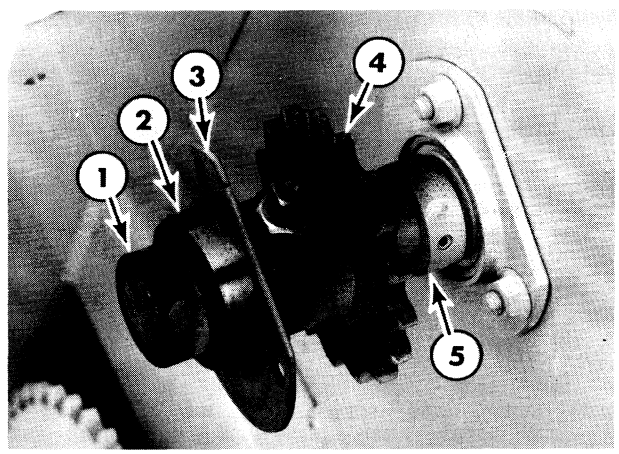


Figure 4-26

2380–12

The components which make up the LH auger assembly.

1 - Bearing cover
2 - Carriage bolts (3) - M8x30
3 - Bearing flangettes
4 - Outer lock collar
5 - Bearing
6 - Sprocket, 17-tooth
7 - Lock collar, inner
8 - Carriage bolts - M8x20
9 - Square key
10 - Left-hand auger weld assembly

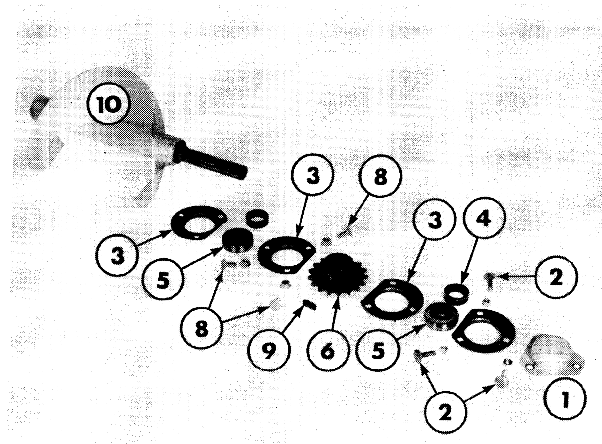


Figure 4-27

2380-9

REASSEMBLY AND ADJUSTMENT

Reverse the disassembly procedure for proper assembly. Before securing the driven sprocket, 6, check the alignment between the reel sprocket at 4 and the drive sprocket, 11.

Complete the reassembly and adjust the drive chain to 3/16″ - 3/4″ (5 mm -20 mm), as shown in Figure 4-24. Reinstall the auger shield and pickup wheel. Be sure the pickup wheel is set at the same height as the opposite side.

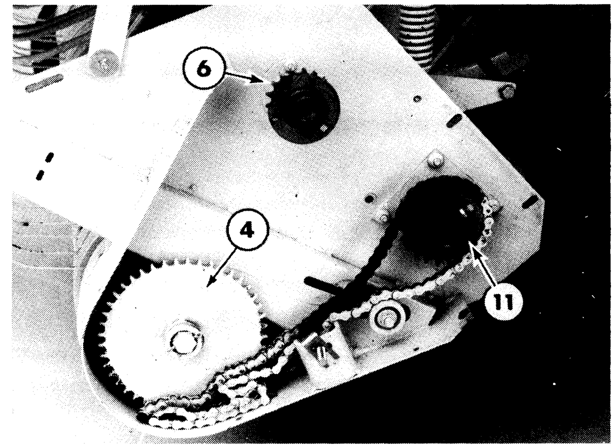


Figure 4-28

2380-5

Check the clearance between angle, 12, and the auger flighting. It should be adjusted to within 1/8″ (4 mm) at the closest point through auger rotation.

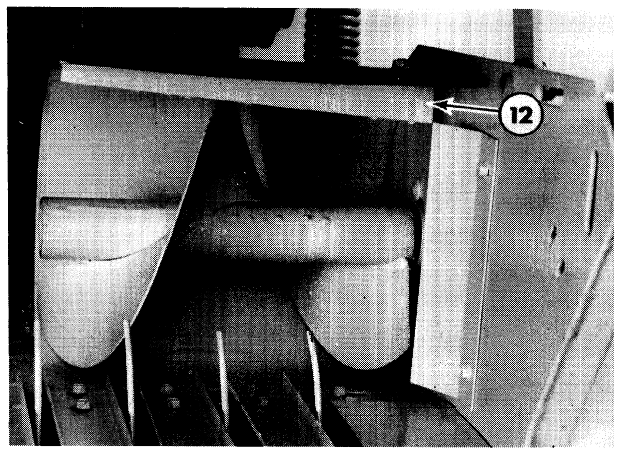


Figure 4-29

2380-11

WIDE PICKUP REMOVAL

Removal of the pickup from the baler should be done when either major repair is required on the pickup or access to other components is required.

Remove the shield over the pickup drive by loosening the three cap screws at 1.

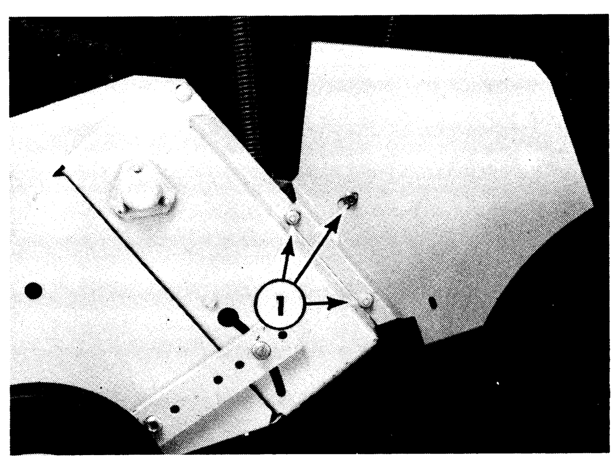
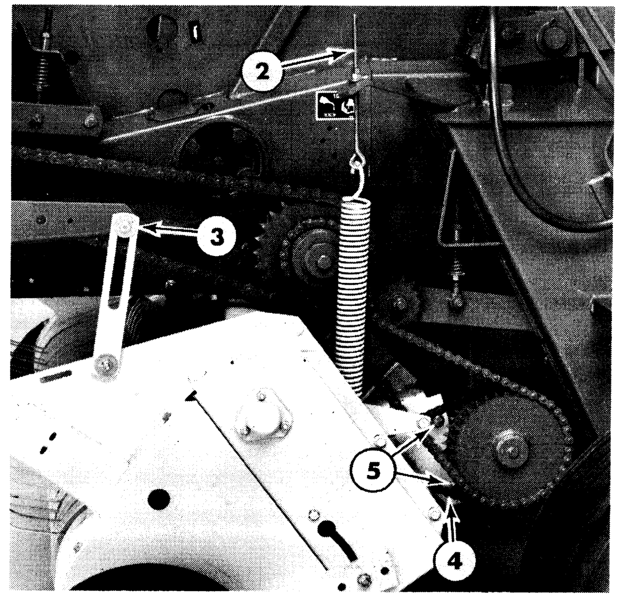


Figure 4-30

A2379-11

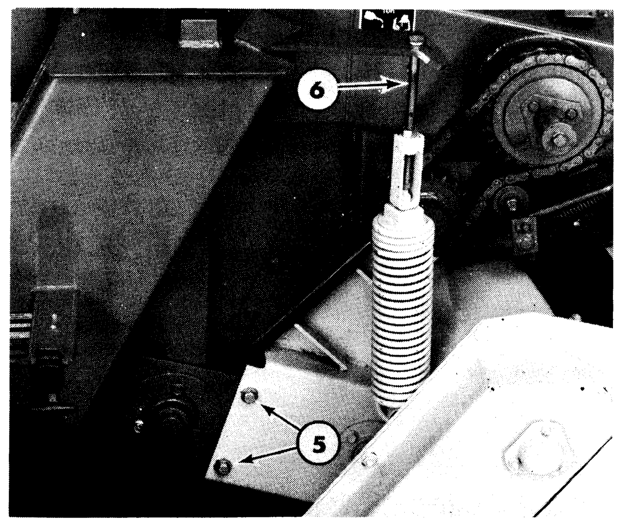
Loosen and remove the flotation spring and eyebolt at 2. With the pickup down resting on the wheels, remove the cap screw at 3. Loosen and remove the drive chain at 4. Loosen cap screws at 5, but do not remove at this time.



2381-2

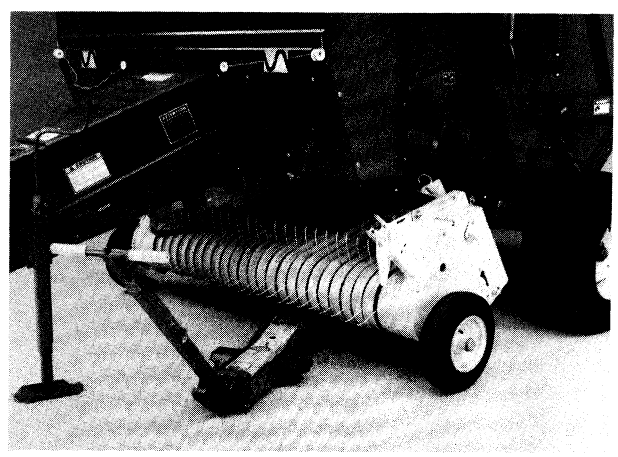
Figure 4-31

Loosen the jam nut and remove the flotation spring bolt at 6, Figure 4-32. Position a floor jack or rolling dolly under the center of the pickup. See Figure 4-33. Remove the two cap screws from each end of the pickup at 5, Figures 4-31 and 4-32. Disengage the pickup from the pivots and remove from under the baler. See Figure 4-33.



2381-3

Figure 4-32



A2381-1

Figure 4-33

SLIP CLUTCH REPAIR

For clutch jaw or bearing replacement, removal of the pickup is not mandatory; however, access is greatly improved.

Remove the cap screws at 1, and remove the drive shield.

Loosen and remove the pickup wheel assembly. Remove the three cap screws at 2 to free the outer auger bearing from the support. Remove the remaining cap screws, 3, and lift off the support weld assembly.

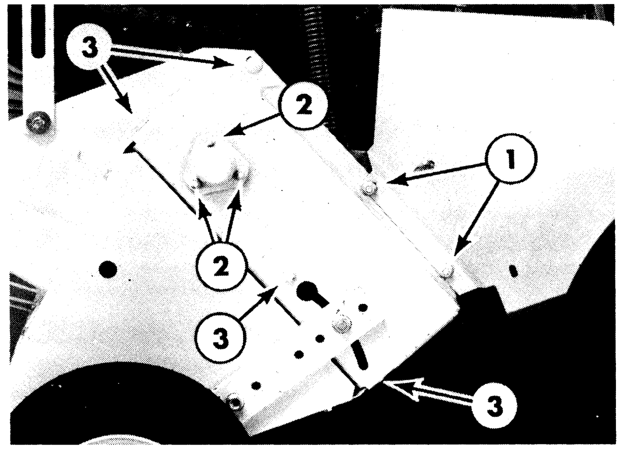


Figure 4-34

1634-4

Loosen and remove drive chain, 4, and sprocket, 5.

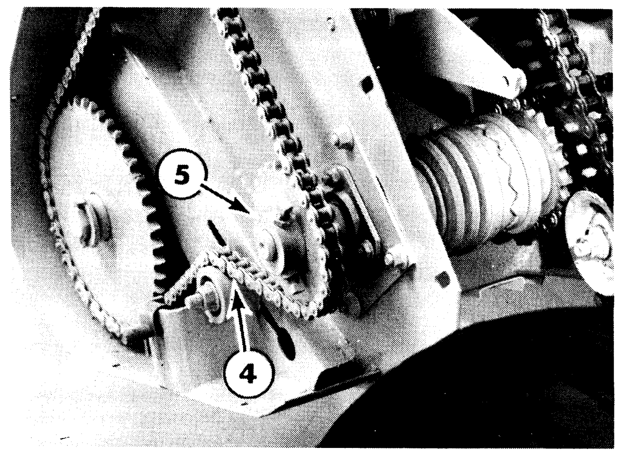


Figure 4-35

1634-2

Remove the lock collar, 6. Remove the four cap screws at 7, and remove the bearing, flangette, and mounting plate as an assembly.

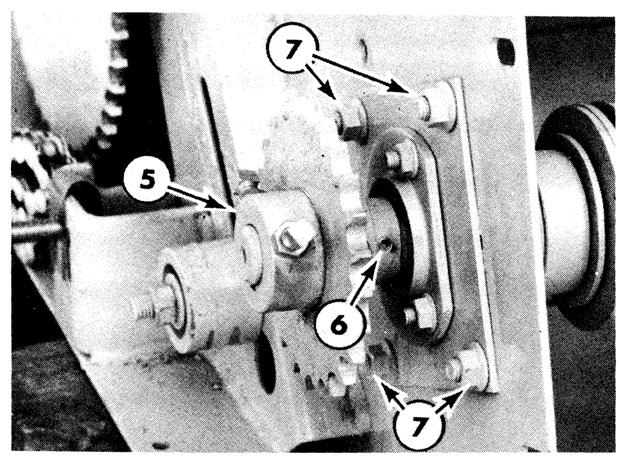


Figure 4-36

2381-7

Remove the cotter pin and slotted nut. The complete clutch assembly can now be removed from the shaft. Figure 4-37 shows the components which make up the clutch assembly.

8 - Cotter pin
9 - Slotted nut
10 - Washers
11 - Backing ring
12 - Washer
13 - Spring washer
14 - Hub
15 - Clutch jaws
16 - Sprocket & hub weld assembly
17 - Washer
18 - Shaft

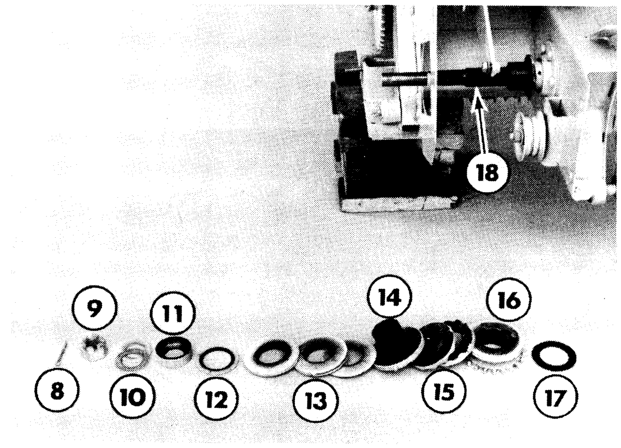


Figure 4-37

2381-6

INSPECTION

Inspect the shaft support bearing, clutch jaws, and sprocket hub weld assembly. Replace any parts which appear damaged.

INSTALLATION

Apply a light coat of grease to the shaft assembly and between the clutch jaws. Reassemble the clutch in the reverse of the disassembly procedure. Tighten the slotted nut until the spring washers cannot be rotated by hand.

NOTE: This setting will produce the 5,000 in. lbs. (565 N·m) required for proper clutch operation. If the clutch slips under light load, increase the setting by two flats on the slotted nut.

Install the cotter pin. Adjust the reel and auger drive chain to 3/16″ - 3/4″ (5 mm - 20 mm) as shown in Figure 4-24. Reinstall the support weld assembly.

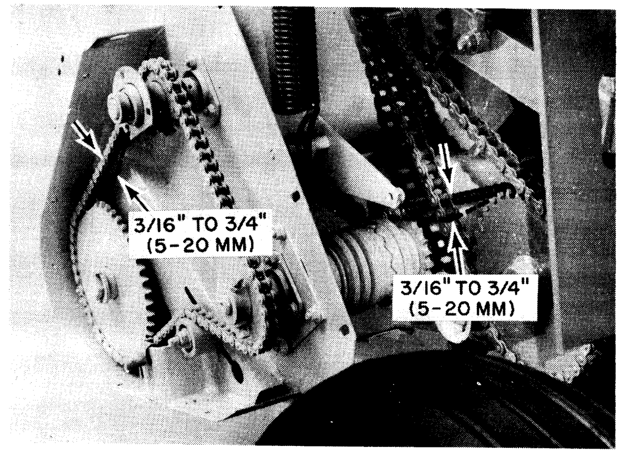


Figure 4-38

1634-2

If the pickup was removed from the baler, reinstall the shield over the reel/auger drive and pickup wheel. Reposition the pickup on the baler and torque the M12 x 30 cap screws to 72 ft. lbs. (97 N·m). Replace the pickup drive chain and adjust to 3/16″ - 3/4″ deflection, as shown in Figure 4-37. Reinstall the lift link and flotation springs. Adjust the pickup flotation spring bolts until 100 lbs. (45 kg) is required to lift the pickup at the pickup wheel.

STUFFER (FEEDER WELD ASSEMBLY) REPAIR

For repair of the stuffer and its components, removal of the pickup is not mandatory; however, access is greatly improved. See "Wide PickUp Removal" earlier in this section.

Remove the left-hand pickup wheel and shield covering the auger and reel drive chain. Loosen and disconnect the drive chain.

Remove the cap screws at 1, to remove the support weld assembly.

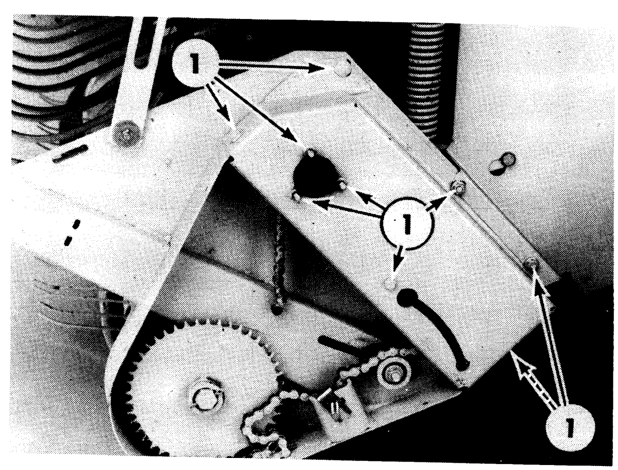


Figure 4-39

A2380-7

Remove the four cap screws and nuts at 2.

Loosen the lock collar at 3.

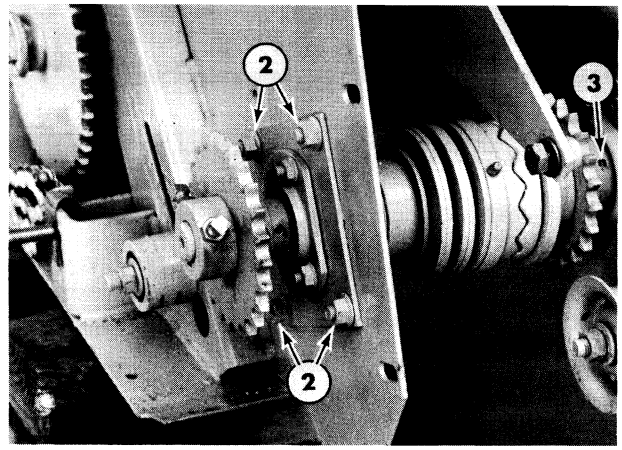


Figure 4-40

2381-7

Disconnect the link arm assembly, 4, from the stuffer by removing the M12 x 100 cap screw and locknut. Loosen and remove the cap screws at 5 and 6, Figure 4-41.

Using a punch and hammer, drive the clutch shaft, 7, Figures 4-41 and 4-42, out far enough to allow removal of the stuffer arm.

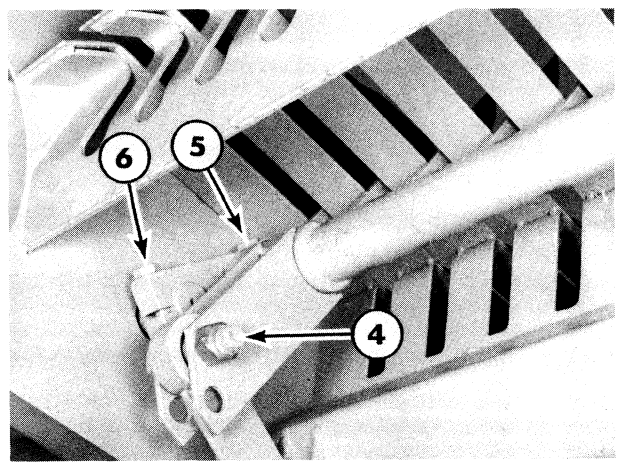


Figure 4-41

A4136-2

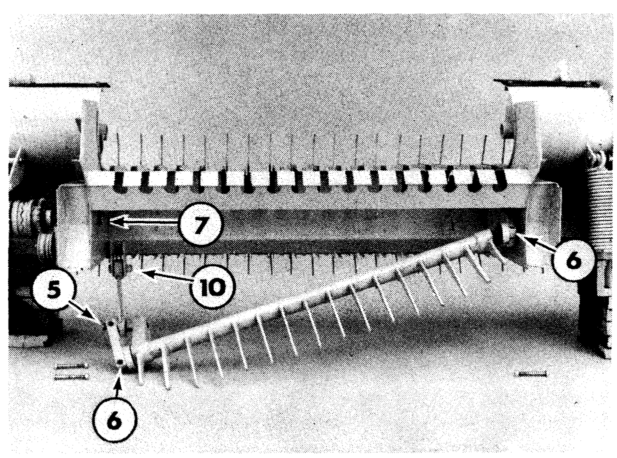


Figure 4-42

2381-12

Figure 4-43 shows the complete clutch assembly and stuffer components.

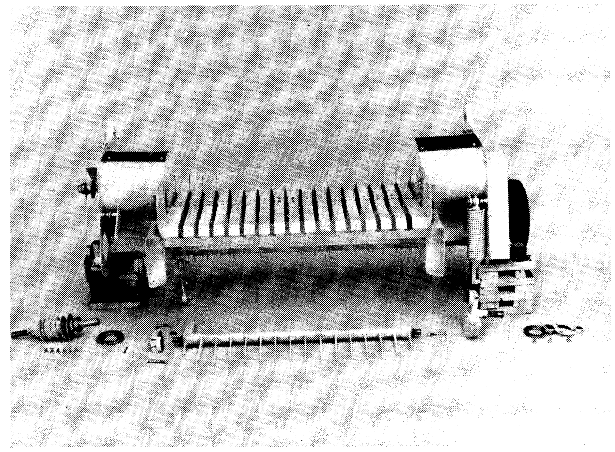


Figure 4-43

2381-11

INSPECTION

Replace any damaged or excessively worn components. Replace any bearings in the feeder (stuffer), 8, Figure 4-44, or link arm assembly, 9, Figure 4-45, which have any damage to the seals or feel rough when rotated.

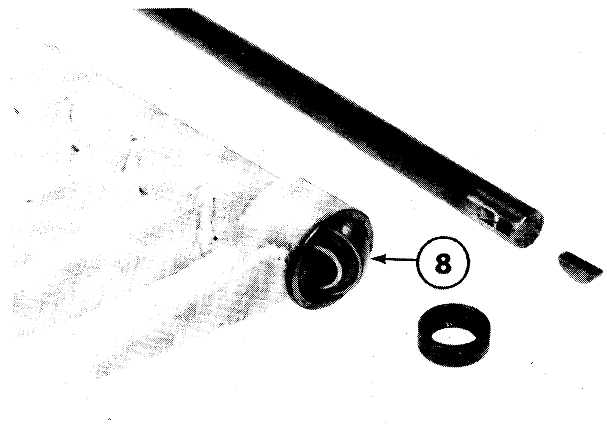


Figure 4-44

2382-3

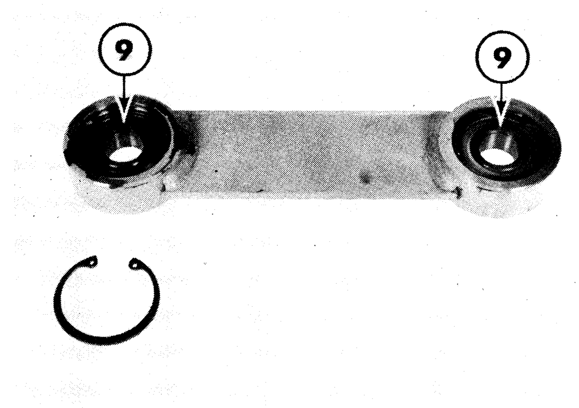


Figure 4-45

2381-9

INSTALLATION

Reassemble the feeder (stuffer) assembly in the reverse of the disassembly procedure. Torque the cap screws and jam nuts at 4, 5, and 6, Figures 4-41 and 4-42, to 39 ft. lbs. (53 N·m). Torque cap screw, 10, to 97 ft. lbs. (131 N·m). Install and adjust the reel and auger drive chain and main drive chain as shown in Figure 4-46.

Replace all shielding and the pickup wheel.

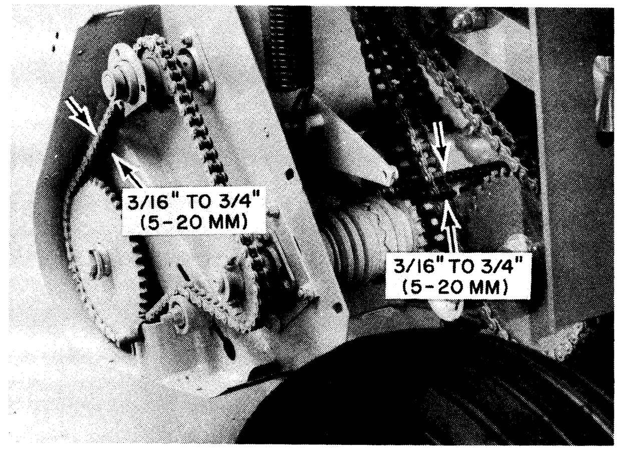


Figure 4-46

1634-2

CAM TRACK REPLACEMENT

To obtain better access to the pickup, removal of the complete assembly is recommended, but not required. See "Wide Pickup Removal" earlier in this section.

On each end of the pickup, remove the pickup wheel and shield covering the reel drive. Loosen and disconnect the reel drive chain on the left end. Remove the cotter pin at 4, and remove the reel sprocket.

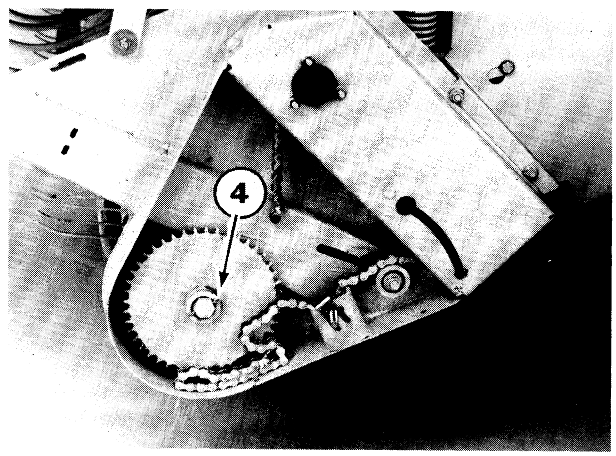


Figure 4-47

2380-7

Remove all the guards covering the reel assembly and set aside. Using a punch and hammer, remove the groove pin, 5, from the spider assembly at each end.

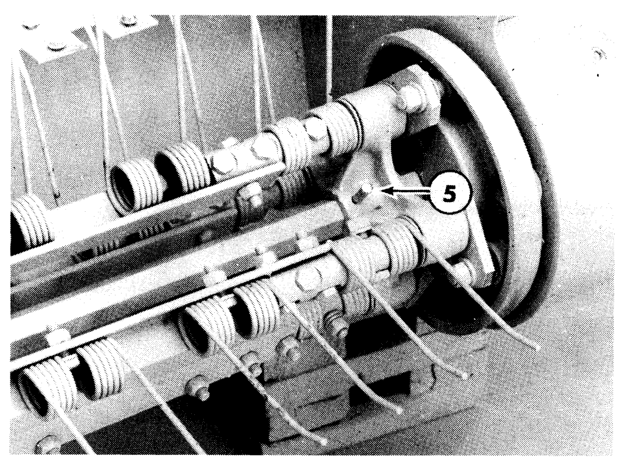


Figure 4-48

2382-2

Remove the cam bearings from each finger assembly. Remove any excessive paint from the reel shaft. Using a dead-blow sledge hammer or other protective means, drive the shaft through the bearing until it clears the cam track.

Remove the three M10 x 20 cap screws securing the bearing flangettes and cam assembly to the frame. Remove the cam assembly.

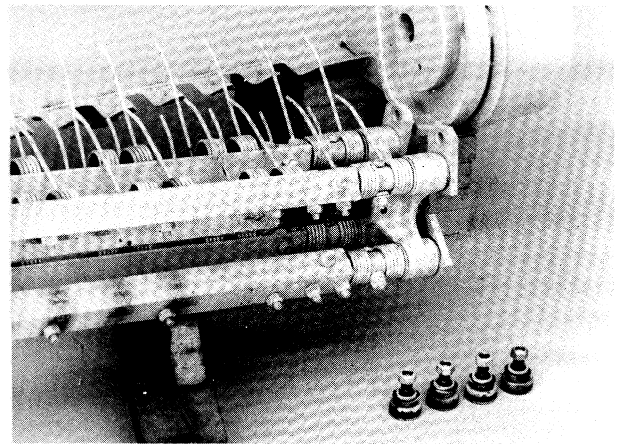


Figure 4-49

2382-1

INSPECTION

Replace all excessively worn or damaged components. Inspect the reel bearings and cam bearings for seal deformation and rough rotation. Replace if in question.

INSTALLATION

Reassemble the cam and reel assembly in the reverse order of the disassembly procedure. Torque the M10 x 20 cam and bearing cap screws to 41 ft. lbs. (56 N·m). Torque the cam bearing locknuts to 64 ft. lbs. (88 N·m).

Replace the guards and torque the M6 x 12 self-tapping screws not to exceed 102 in. lb. (13 N·m).

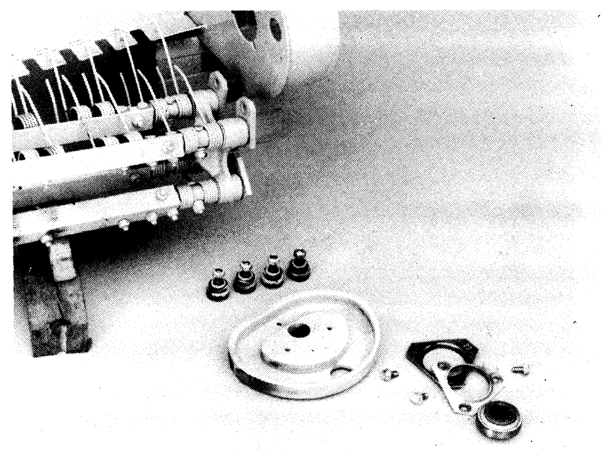


Figure 4-50

A2382-8

NOTE: Be sure the reel fingers clear all guards before torquing the guard hardware.

Replace the reel and auger drive chains and adjust as shown in Figure 4-24. Replace the shields and pickup wheels.

Reposition the pickup assembly on the frame pivots and torque the M12 x 30 cap screws to 72 ft. lbs. (97 N·m). Replace the pickup drive chain and adjust to 3/16″ - 3/4″ deflection.

Adjust the pickup flotation springs to obtain 100 lbs. (45 kg) when measured at the pickup wheel.

LABOR GUIDE

	HOURS
STANDARD PICKUP	
Finger Replacement	0.35
Cam Bearing Replacement	1.25
Slip Clutch Repair	0.5
Pickup Removal	0.5
Cam Track Replacement	4.0
WIDE PICKUP	
Finger Replacement	0.35
Cam Bearing Replacement	1.25
Auger Repair	1.5
Pickup Removal	0.5
Slip Clutch Repair	2.5
Feeder (Stuffer) Repair	3.0
Cam Track Replacement	3.5

INDEX

SECTION 5

SLIP CLUTCHES

This section details the various clutches used for component protection.

The Models 634 and 644 (except 644 silage special) use a shear bolt design for main drive protection and are, therefore, excluded from this section.

NOTE: For pickup slip clutch repair, see Section 4.

MAIN DRIVE SLIP CLUTCH

The Models 654 and 664 use the slip clutch shown in Figure 5-1 for protection of the main components.

It will be necessary to remove the driveline in order to have sufficient clearance to disengage the main clutch from the gearbox input shaft.

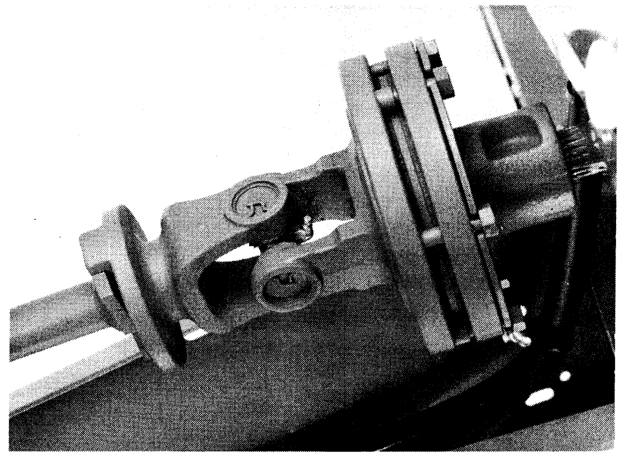


Figure 5-1

A3973-13

DRIVELINE REMOVAL

Loosen and remove the 1/2″ setscrew and jam nut at the rear PTO yoke, 1 and 2. Remove the rear PTO assembly from the shaft.

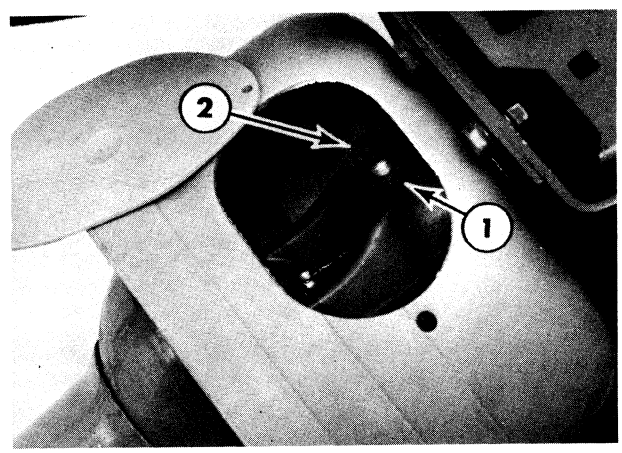


Figure 5-2

2364–5

Remove the cap screws and nuts securing the bearing flangettes to the bearing support at 3.

The shield ring, shield, front bearing, and flangette can now be removed.

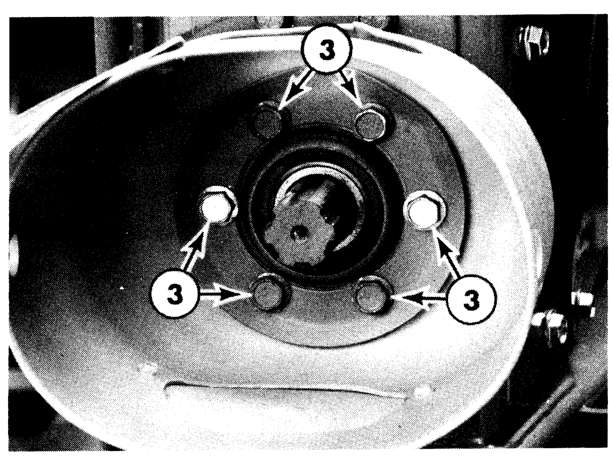


Figure 5-3

2364-12

Remove the snap ring at 4, Figure 5-4. The PTO drive shaft can now be slid forward, clear of the rear U-joint and clutch assembly. See Figure 5-5.

The clutch will now slide off the gearbox shaft.

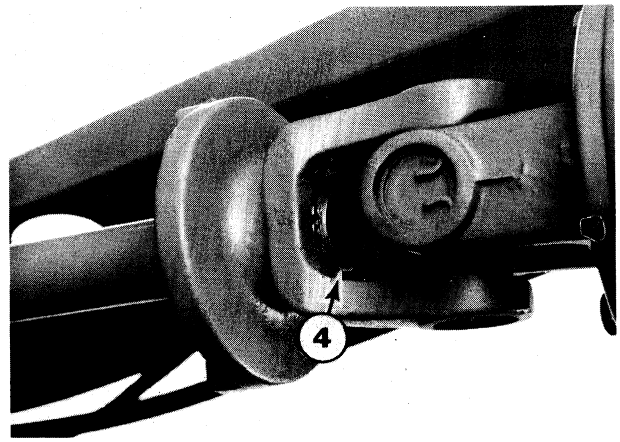


Figure 5-4

2364-11

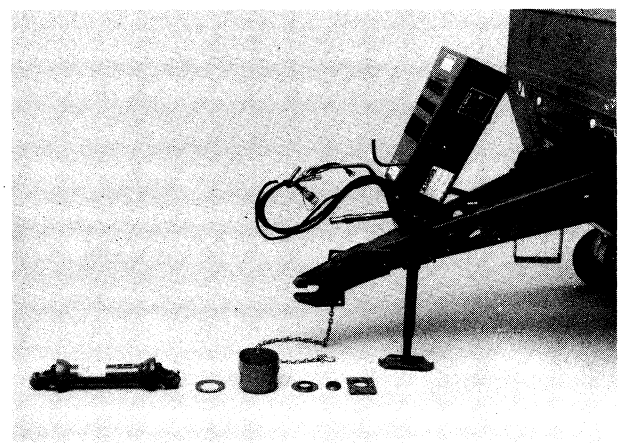


Figure 5-5

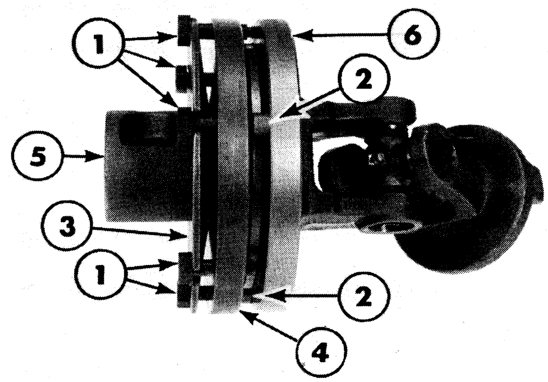
2364-10

Disassembly

Loosen the six cap screws, 1, evenly in a circular pattern in stages of 1-1/2 turns each. When the bolts are loose, remove each one, noting that three have sleeves, item 2, which can be easily lost. See 5-1.

Remove the disc spring, 3, and pressure plate, 4, from the remainder of the clutch. Remove drive hub, 5, and any friction disc material from the drive hub faces.

NOTE: Be careful not to damage the six pins located in the drive hub when removing friction disc material.



A-3992-13

Figure 5-6

Inspection

Remove any material that may have bonded to drive hub, 5; pressure plate, 4; and yoke base, 6.

Surfaces where friction disc material come in contact should be rubbed in a radial direction with 80 grit sandpaper.

Now that all surfaces are cleaned, perform a final visual inspection to ensure that warpage, gouges, or surface heat cracks have not been created due to excessive heat buildup from extensive periods of clutch slippage. Replace components where any of these conditions are present.

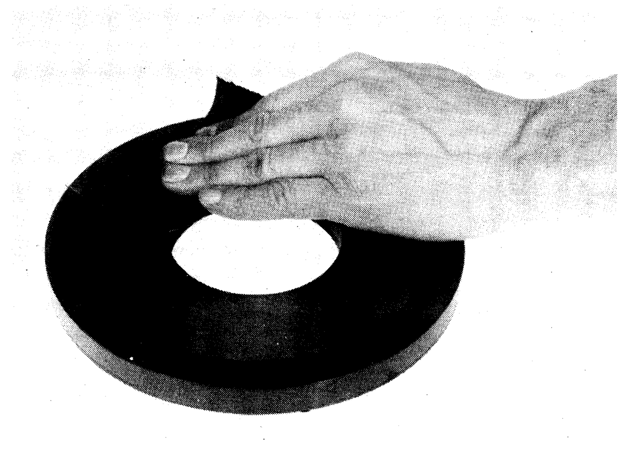


Figure 5-7

2374-11

Assembly

Install new friction material on the pilot side of the drive hub by positioning discs over 1/4″ pins. While holding friction material in position, install the drive hub to the yoke flange. Place a second disc on the remaining face of the drive hub.

Be careful not to allow the new friction discs to come into contact with any grease, oil, or solvents, as they may prevent the discs from performing properly.

After ensuring that both discs are seated properly, place the pressure plate over the drive hub. Make sure the wear surface is positioned to contact the friction material.

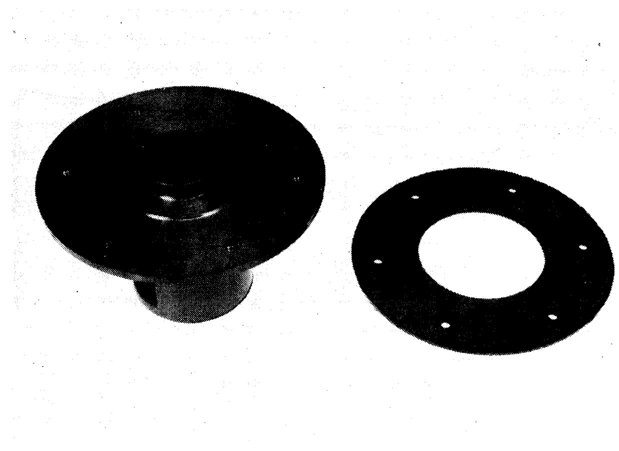


Figure 5-8

2374-9

Place a thin layer of antiseize to the outer OD of the concave face of the disc spring, 1.

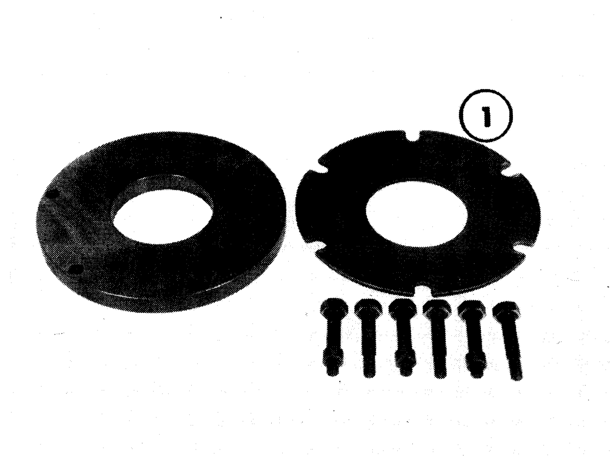


Figure 5-9

3992-14

Apply a thin layer of antiseize to the underside of the shoulder bolt heads. Install shoulder bolts with a spacer on every other bolt. Make sure the spacers are installed between the yoke flange plate and the pressure plate, not between the pressure plate and the spring plate.

Turn bolts until finger tight. Set torque wrench to 40 ft. lbs. - 45 ft. lbs. (54 N·m - 61 N·m). Tighten bolts in a circular direction. Turn individual bolts a maximum of three turns or until the torque wrench reads 40 ft. lbs. - 45 ft. lbs. (54 N·m - 61 N·m). Perform a final torque check on all bolts.

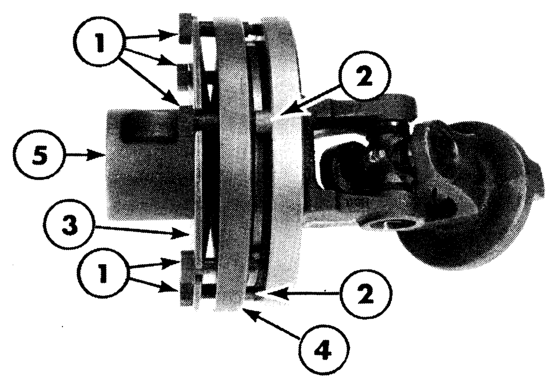


Figure 5-10

INSTALLATION ON BALER

Apply a thin coating of grease to the gearbox input shaft and install the clutch and yoke assembly.

Repeat the lubrication procedure on the drive hub bushing and install the snap ring on the shaft.

Replace the front PTO bearing, flangettes, and shield. Torque the M10 cap screw at 3, Figure 5-4, to 41 ft. lbs. (56 N·m). Apply antiseize to the PTO drive shaft and install the rear PTO yoke.

Torque setscrew, 2, Figure 5-2, to 50 ft. lbs. (68 N·m) using a hammer and punch, rap the head of the setscrew, and retorque. Repeat the hammer seating three times and then lock the jam nut. Lubricate all driveline grease fittings.

BURNISHING THE MAIN CLUTCH

Lock up the main drive chain as shown in Figure 5-11.

NOTE: See Figure 5-28 for information on fabricating the special tool.

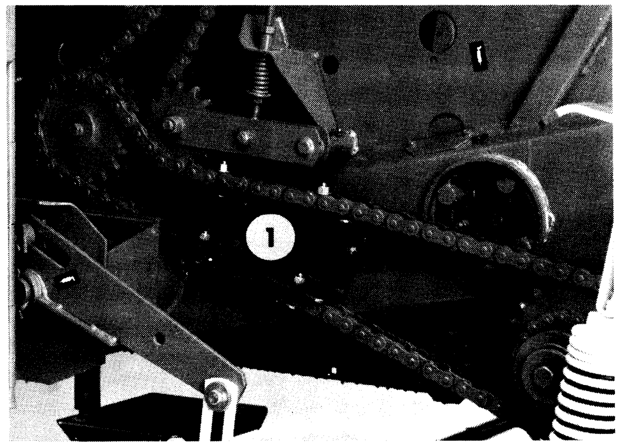


Figure 5-11

A1737-2

HOOK THE BALER TO A TRACTOR

With the drive locked up, as shown in Figure 5-11, quickly engage the tractor PTO at low RPM for 5 seconds. Allow the clutch to cool for 2 minutes and reengage the PTO for an additional 5 seconds.

CAUTION: THE CLUTCH WILL BECOME HOT DURING THIS BURNISHING PERIOD. AVOID CONTACT.

Remove the driveline lock-up tool.

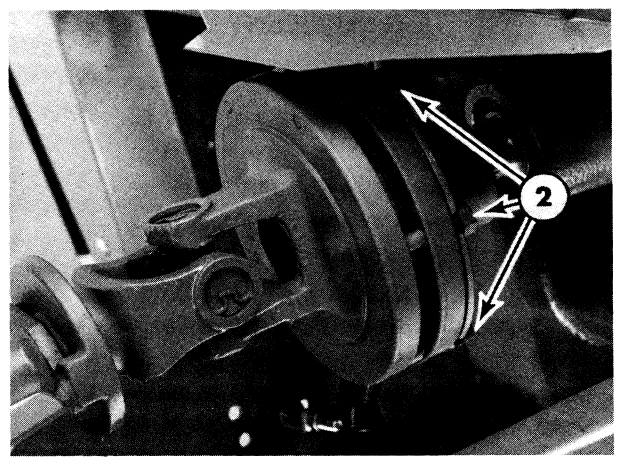


Figure 5-12

A3973-14

CHECKING MAIN CLUTCH SETTING

Models 654 and 664 Only

The main drive slip clutch is nonadjustable. The slip torque should measure:

540 RPM

9,600 in. lbs. - 14,400 in. lbs. (1085 N·m - 1627 N·m)

1000 RPM

6,800 in. lbs. - 10,200 in. lbs. (768 N·m - 1,153 N·m)

NOTE: 1000 RPM clutch can be differentiated from the 540 RPM clutch by a number stamped in the yoke base (Item 6, Figure 5-6). A number 6 indicates 540. A 1 indicates a 1,000 RPM clutch.

To check the slip torque on the clutch, follow the procedure for burnishing the clutch described previously. After burnishing, allow the clutch to cool 5 to 10 minutes. With the drive locked as shown in Figure 5-11, install checking tool 2 with handle, Figure 5-28, as shown in Figure 5-13.

Using a spring scale with checking tool 2:
540 RPM units should be between 100 lbs. and 160 lbs. pull on the scale
1000 RPM units should be 75 lbs. - 110 lbs.

If after checking the clutch it does not fall within the range, perform the following:

Below Specification Range

Be sure the clutch is cool before rechecking.

a. Reinspect the metal plates between the friction disc for distortion or excessive wear.
b. Replace Belleville washer.
c. Use a different spring scale to check accuracy.

Above Specification Range

Repeat burnishing procedure, let cool, and recheck.

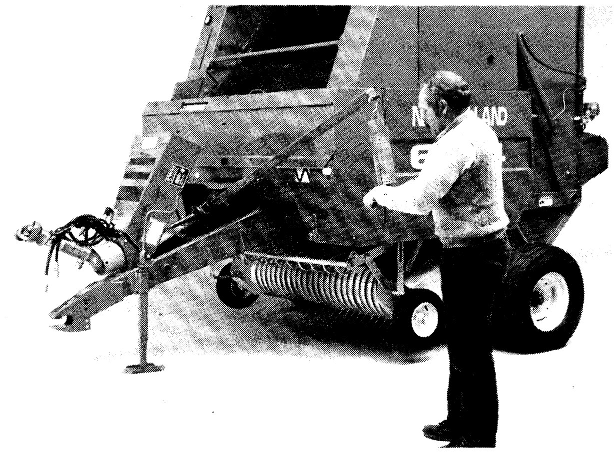


Figure 5-13

FLOOR ROLL DRIVE CLUTCH

The floor roll drive clutch, 1, is a jaw-style clutch used on the Models 644, 654, and 664. It should jump or slip whenever the floor roll is unable to turn.

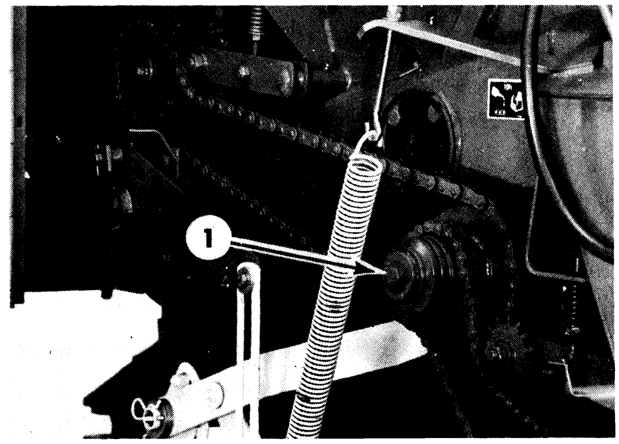


Figure 5-14

1485-9

DISASSEMBLY

Loosen the nut at 2 to remove the tension from the drive chain. Remove the connector at 3 from the drive chain. Loosen and remove the cap screw and washer at 4. Remove the splined hub and spring washers. Disengage the drive sprocket from the outer clutch jaw and set aside.

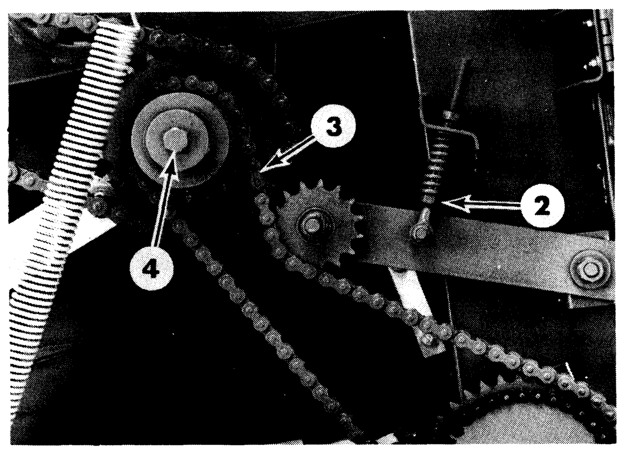


Figure 5-15

1493-5

Remove the two clutch jaws at 9.

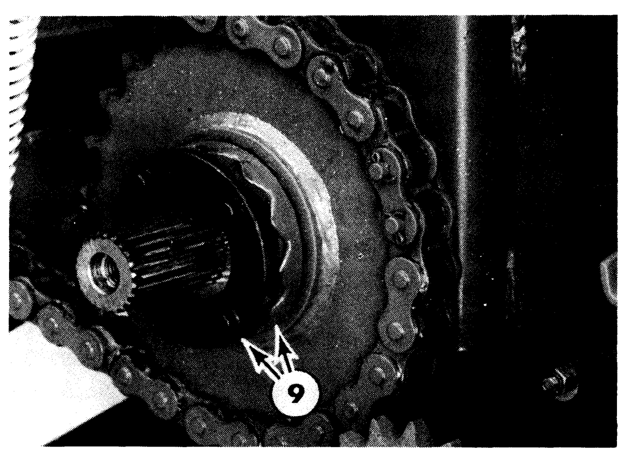


Figure 5-16

1494-6

The components which make up the floor roll clutch assembly are shown.

4 - M16 x 40 cap screw and flat washer
5 - Splined hub weld assembly
6 - Spring washers
7 - Shim washers (5)
8 - Drive sprocket
9 - Clutch jaws

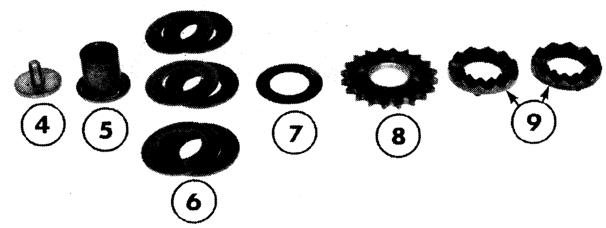


Figure 5-17

1496-12

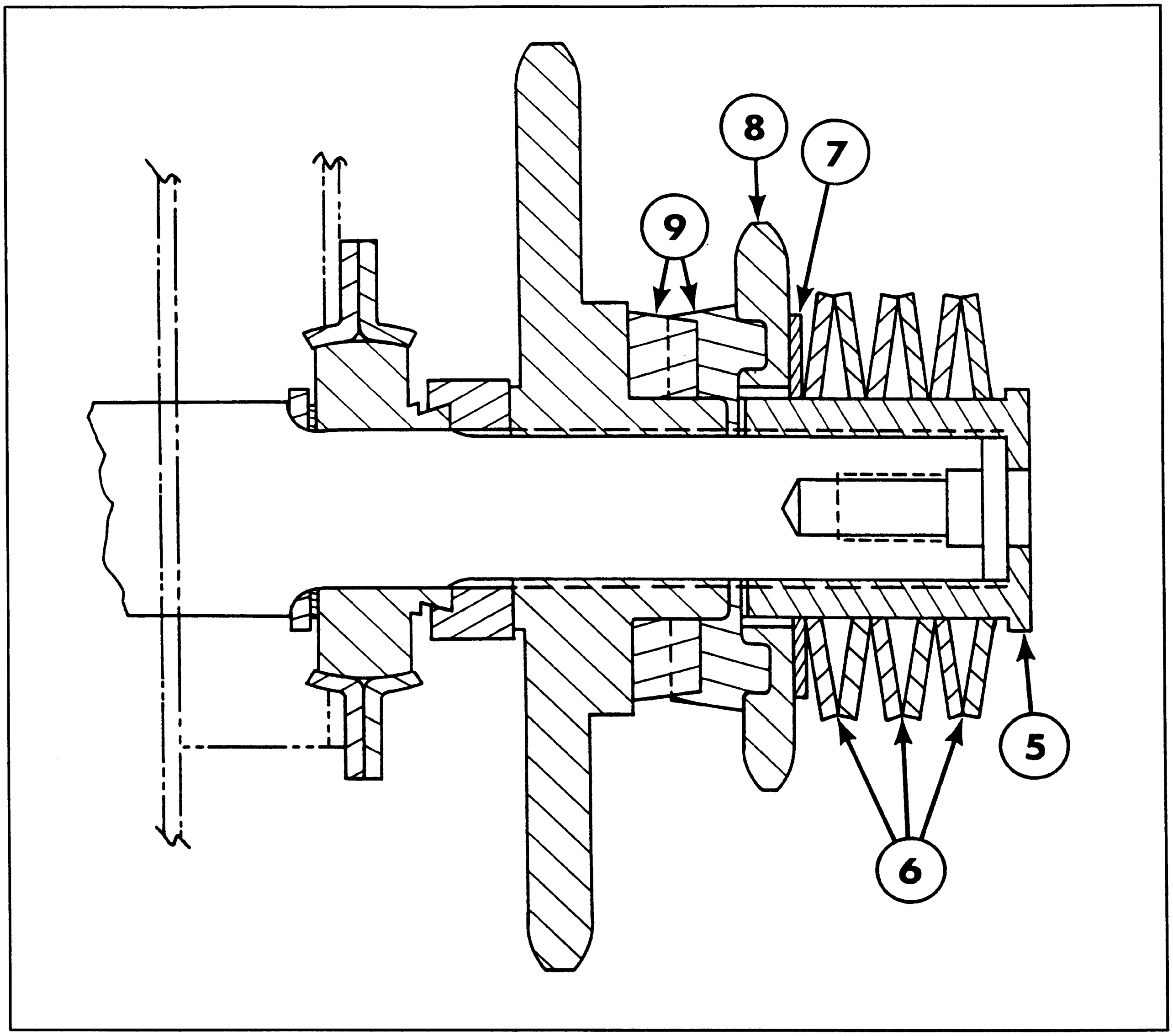


Figure 5-18

INSPECTION

Replace the clutch jaws if evidence of poor fit is observed between mating jaws, 9, Figure 5-18.

Inspect the bushing in drive sprocket, 8. If excessive free play exists between the splined hub weld assembly, 5, and the drive sprocket bushing, it should be replaced.

ASSEMBLY

Reassemble the clutch jaws with a light coating of grease and install as shown in Figures 5-15 and 5-18. Complete the assembly in the reverse order of disassembly. Tighten, but do not torque, cap screw, 4, Figure 5-15, at this time.

CHECKING FLOOR ROLL DRIVE CLUTCH SETTING

The floor roll drive clutch should be set to slip at 8100 in. lbs. - 9960 in. lbs. (915 N·m - 1125 N·m).

One method for checking the floor roll clutch is shown in Figure 5-19. To use this method:

Use special tool, 3, with handle 1, Figure 5-28. Lock up the main drive chain as shown at 1, Figure 5-19.

NOTE: See Figure 5-27 for information on fabricating the special tool.

Using a spring scale with clutch tool 3 as shown in Figure 5-18, the jaws should be a maximum separation at 102 lbs. - 125 lbs. pull.

If the clutch jaws advance at less than the above tension, add shim(s), part #263422, at 7, Figure 5-18.

After the proper range has been established, remove the M16 x 40 cap screw, 4, Figure 5-17, and apply 242 Loctite to the threads. Torque the cap screw to 177 ft. lbs. (240 N·m).

Remove locking tool, 1, Figure 5-19, and replace the floor roll drive chain. Tighten nut, 2, Figure 5-23, until the spring measures 2″ (51 mm). Replace all shielding.

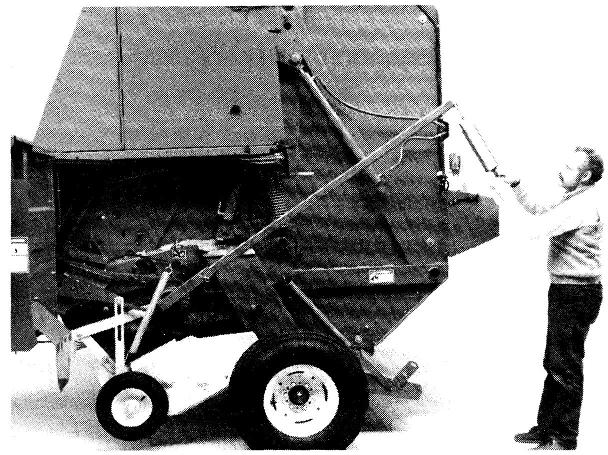


Figure 5-19

2360-4

SLEDGE ROLL DRIVE CLUTCH

Models 644, 654, and 664

The drive is delivered to the right-hand side of the baler, via the starter roll, through the sledge roll drive slip clutch. This clutch, 1, provides the protection for the pivot roll and gear drive for the dimpled rolls of the sledge assembly.

DISASSEMBLY

On Auto-Wrap equipped twine wrappers, remove the drive belt, 2; cap screw, 4; and sheave, 3.

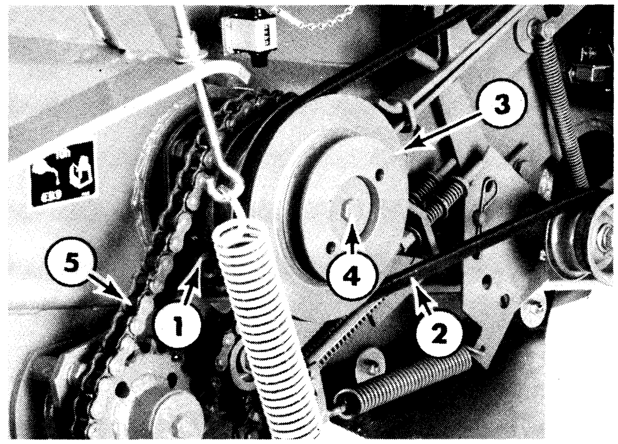


Figure 5-20

1055-6

On Bale Command models, remove the cap screw and spacer at 4.

Loosen and remove drive chain, 5.

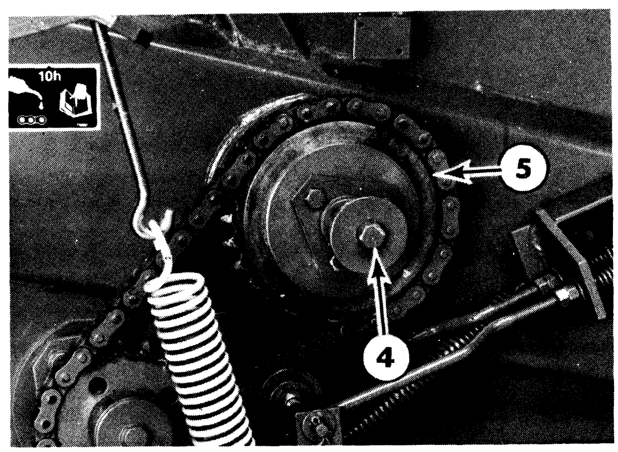


Figure 5-21

1356-11

Remove keeper, 6, the three cap screws, 7, and the two spring washers, 8. The remaining clutch components can be removed from the hub.

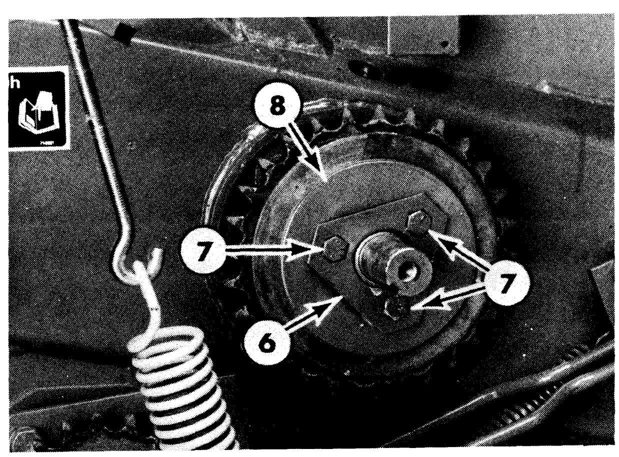
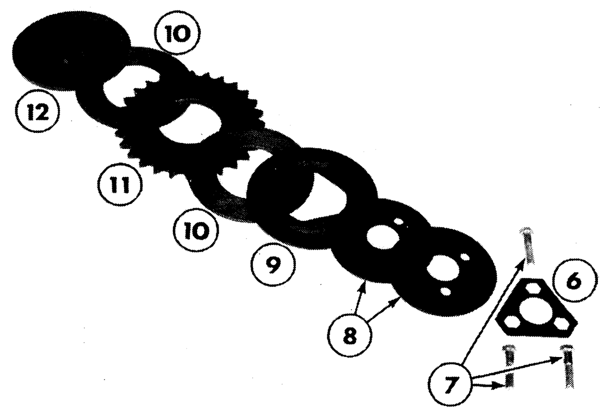


Figure 5-22

1356-10

The components of the sledge roll clutch:

6 - Keeper
7 - Cap screws U.N.F., 3/8 x 1-1/2
8 - Spring washers (2)
9 - Clutch plate
10 - Friction disc (2)
11 - Sprocket
12 - Clutch hub



2547-7

Figure 5-23

INSPECTION

Remove any material that may have bonded to clutch plate, 9, or hub, 12. Surfaces which contact the friction disc should be rubbed radial with 80-100 grit sandpaper. Inspect to ensure that warpage, gouges, or surface heat cracks have not been corroded due to excessive heat buildup from extensive periods of clutch slippage. Replace components where any of these conditions are present.

ASSEMBLY

Figure 5-24

Reassemble in the reverse of the disassembly procedure. Be certain that when installing clutch plate, 9, the sharp edge, 1, is turned toward spring washers, 8. Tighten cap screws, 7, evenly to 300 in. lbs. (4 N·m).

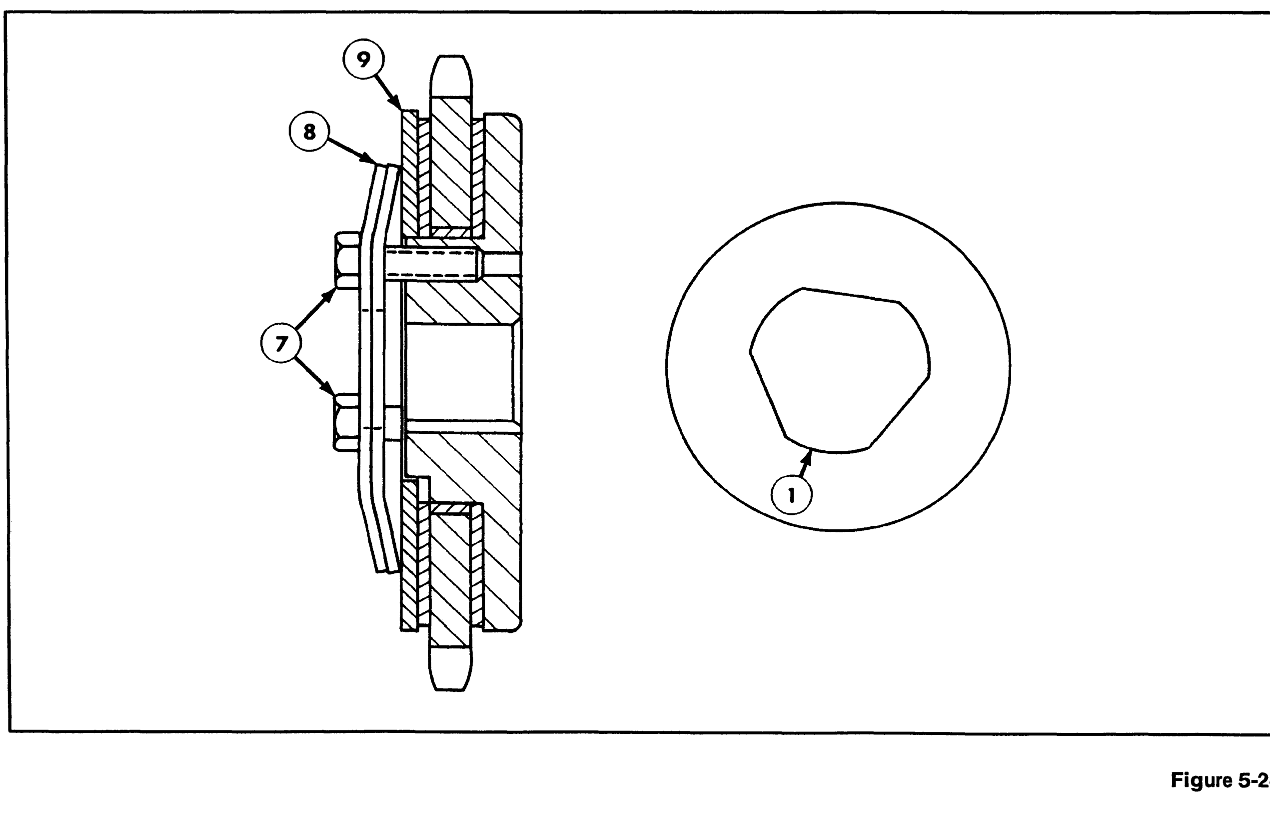


Figure 5-24

One method for checking the sledge roll clutch is shown. To use this method:

Install special tool 4 with handle 1, Figure 5-28, and a spring scale as shown in Figure 5-25.

Figure 5-25

2362-8

Place a pry bar or similar tool between the sledge roll gears to lock up the rolls.

The sledge roll clutch should slip at 6,000 in. lbs. - 6,780 in. lbs. (677 N·m - 722 N·m).

Using tool 4, the spring scale should read 75 lbs. - 85 lbs. at the break or start of clutch slippage. Adjust the three cap screws evenly to obtain the required torque. Remove the special tool and sledge gear locking device.

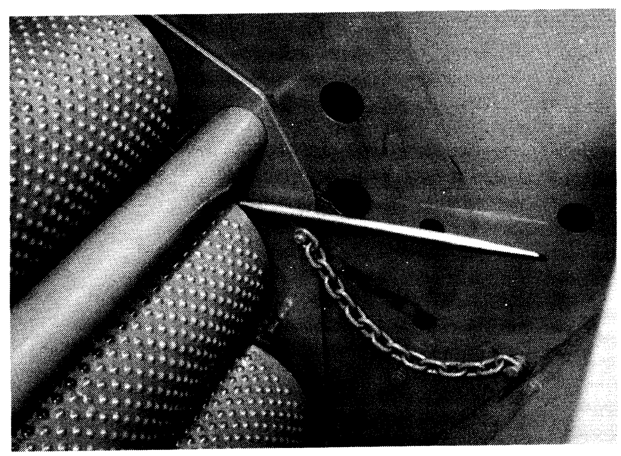


Figure 5-26

A1087-6

Install the drive chain and adjust the tensioning idler to obtain 1/8″ - 5/16″ (3 mm - 8 mm) free play in the chain.

Install the keeper on the three cap screws.

Bale Command Units

Replace the spacer, washer, and cap screw on the shaft at 4.

Torque the cap screw to 41 ft. lbs. (56 N·m).

Auto-Wrap Units

Install drive sheave, washer, and cap screw. Torque to 41 ft. lbs. (56 N·m) and replace the drive belt.

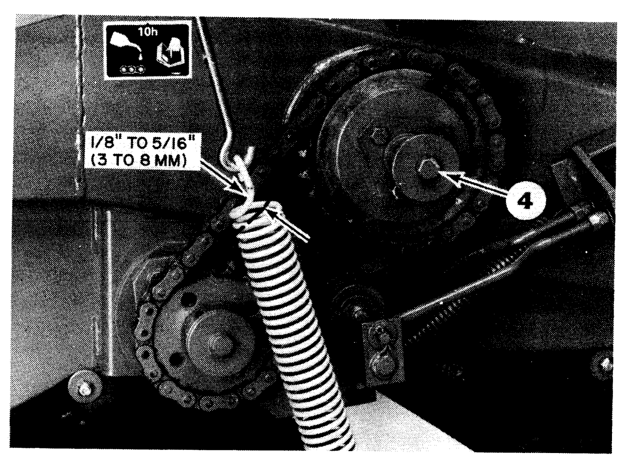


Figure 5-27

1356-11

SPECIAL TOOLS

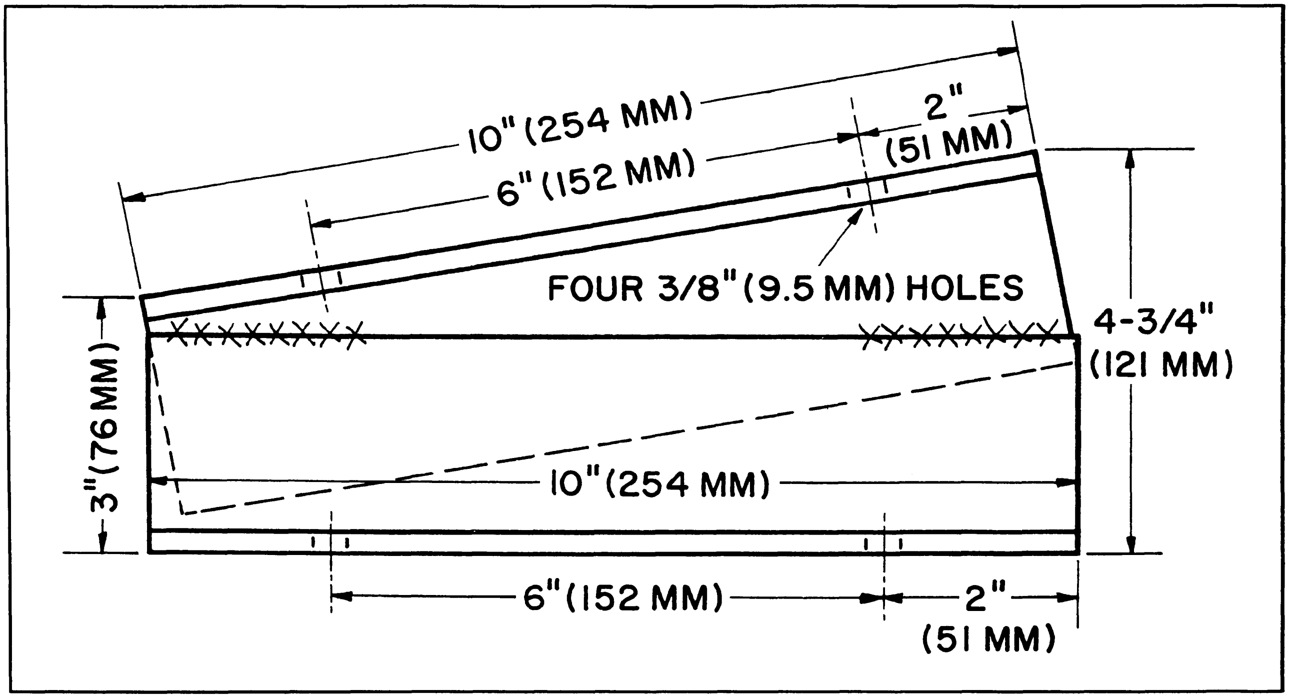


Figure 5-28

Figure 5-28

The drive chain lock-up tool uses two pieces of 10″ x 1/4″ x 2-1/2″ angle iron welded as shown.

Installation requires:

4 - 3/8″ x 2-1/4″ cap screws
8 - 3/8″ heavy washers
4 - 3/8″ nuts

The special tools shown can be constructed using the drawings provided. See Figures 5-29 through 5-32.

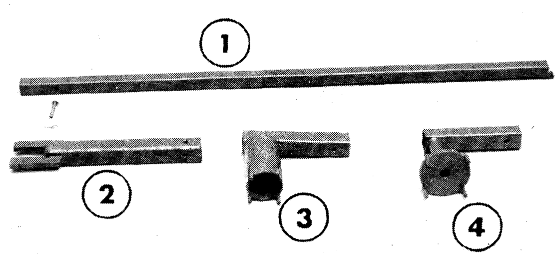


Figure 5-29

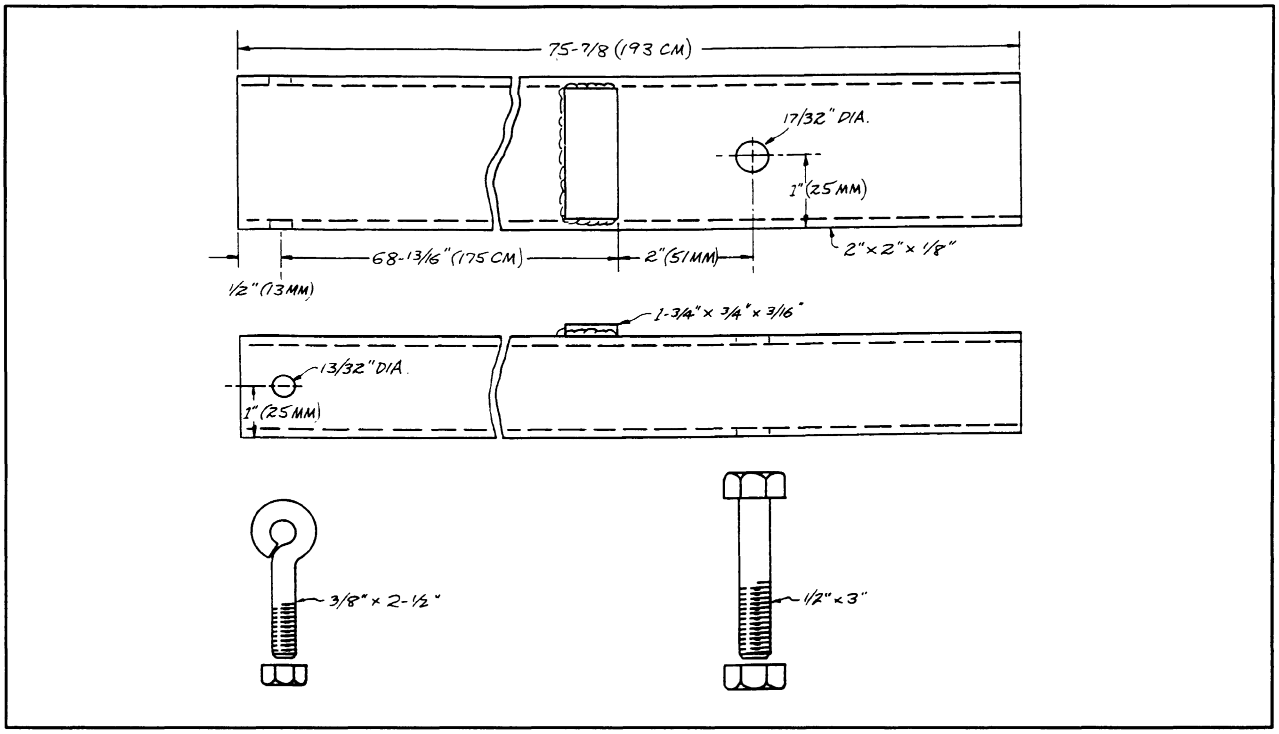


Figure 5-30

Tool handle, Item 1, Figure 5-29.

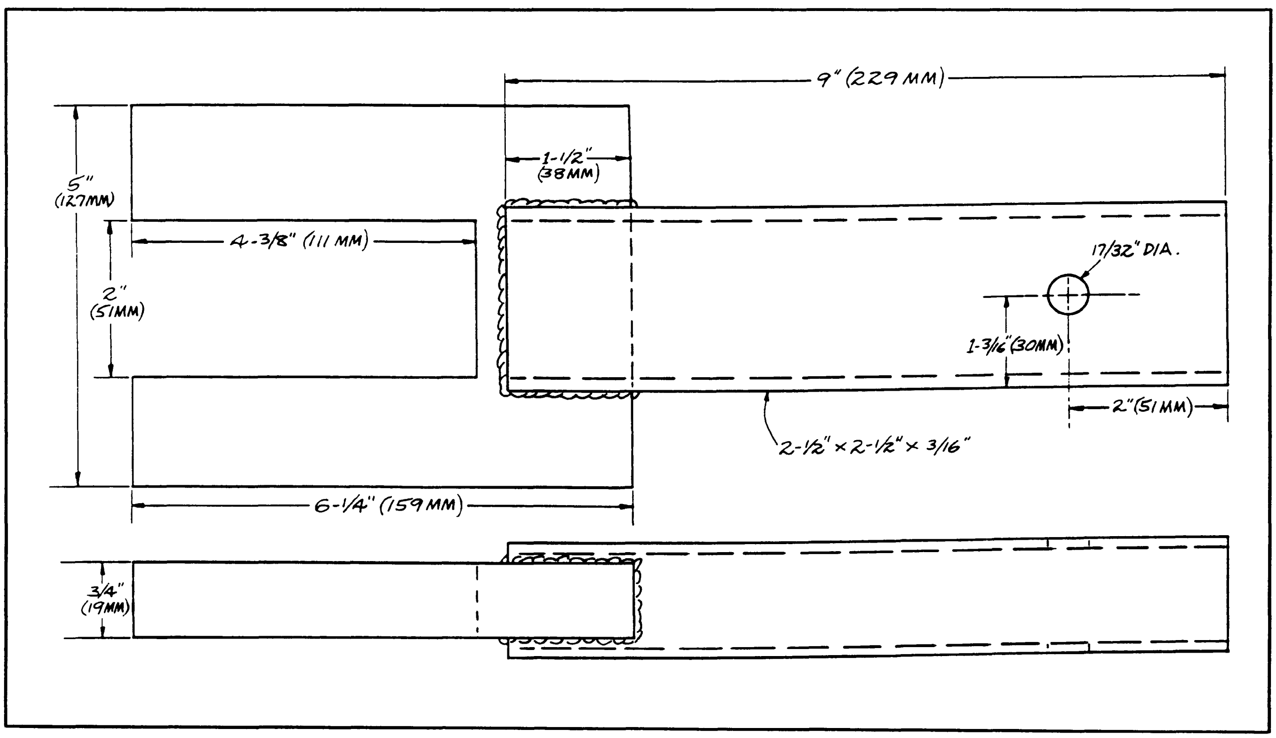


Figure 5-31

Main clutch tool, 2, Figure 5-29, to go over U-joint yoke.

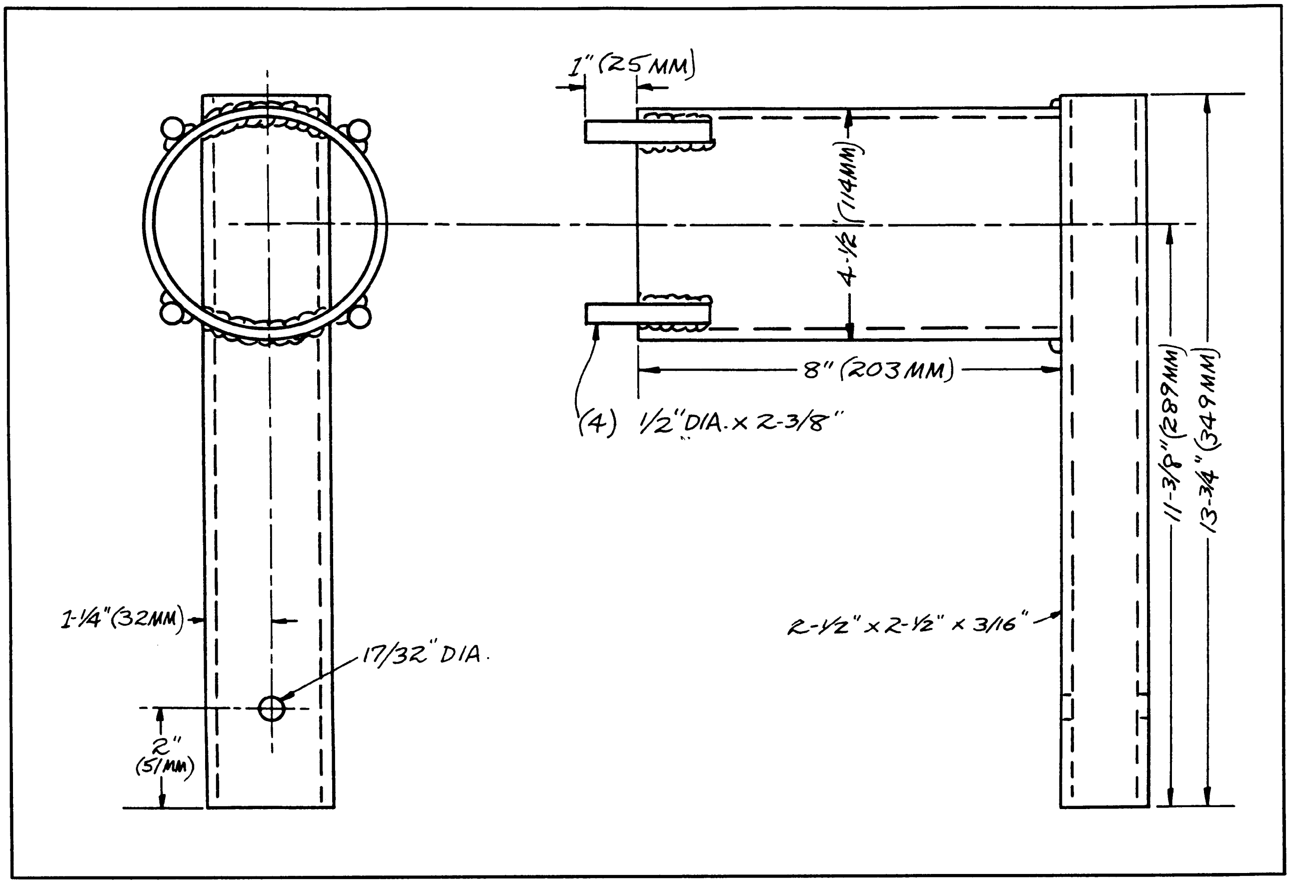


Figure 5-32

Floor roll clutch tool, 3, Figure 5-29.

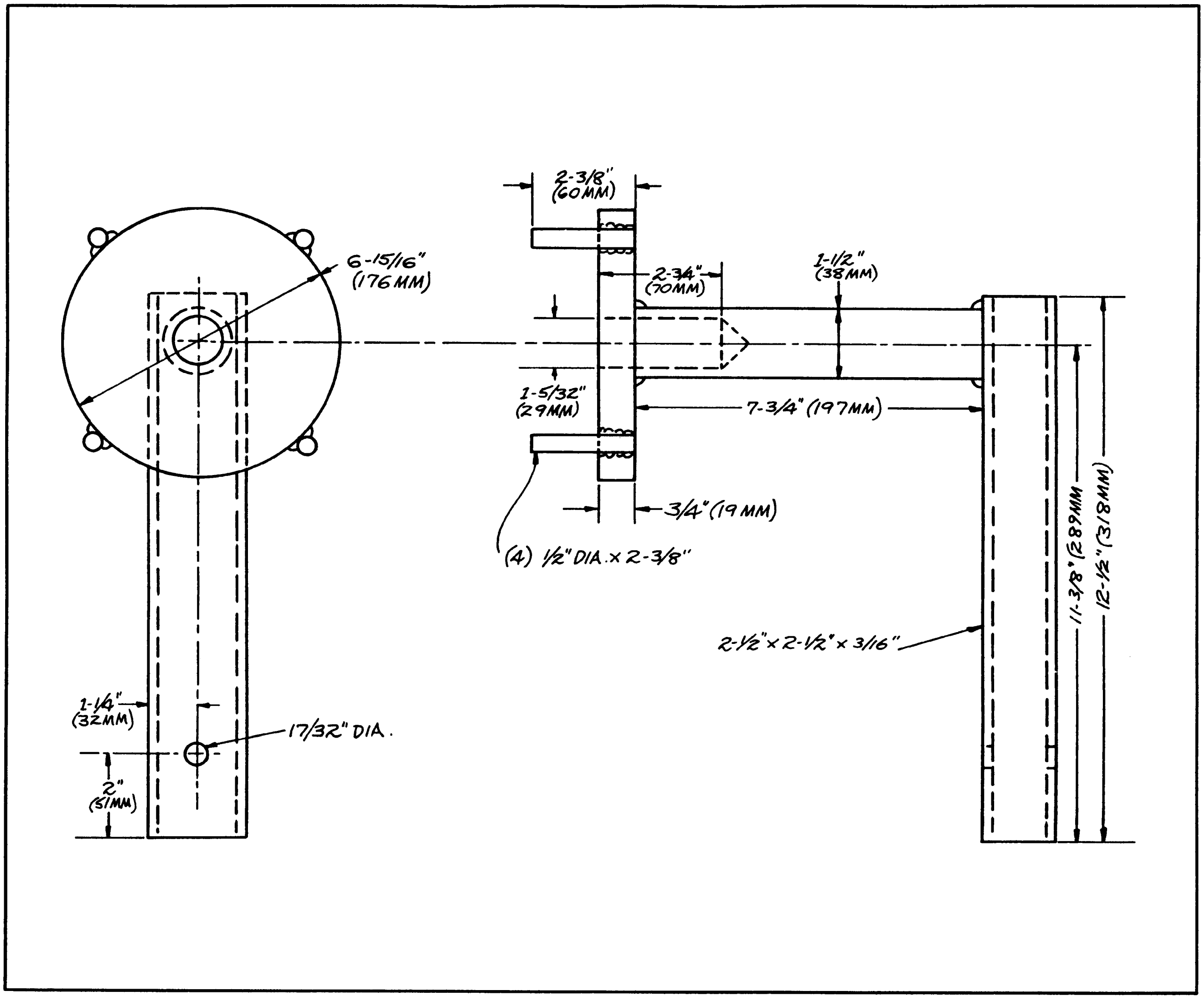


Figure 5-33

Sledge roll clutch tool, 4, Figure 5-29.

LABOR GUIDE

	HOURS
MAIN DRIVE SLIP CLUTCH	
Removal and Replacement	2.5
FLOOR ROLL DRIVE CLUTCH	
Removal, Rebuild, and Replacement	2.0
SLEDGE ROLL DRIVE CLUTCH	
Removal, Rebuild, and Replacement	1.75

INDEX

SECTION 6
FLOOR ROLL AND STARTER ROLL GROUP

Section 6 details the removal and installation of bearings and rolls, 5 and 6, Figure 6-1.

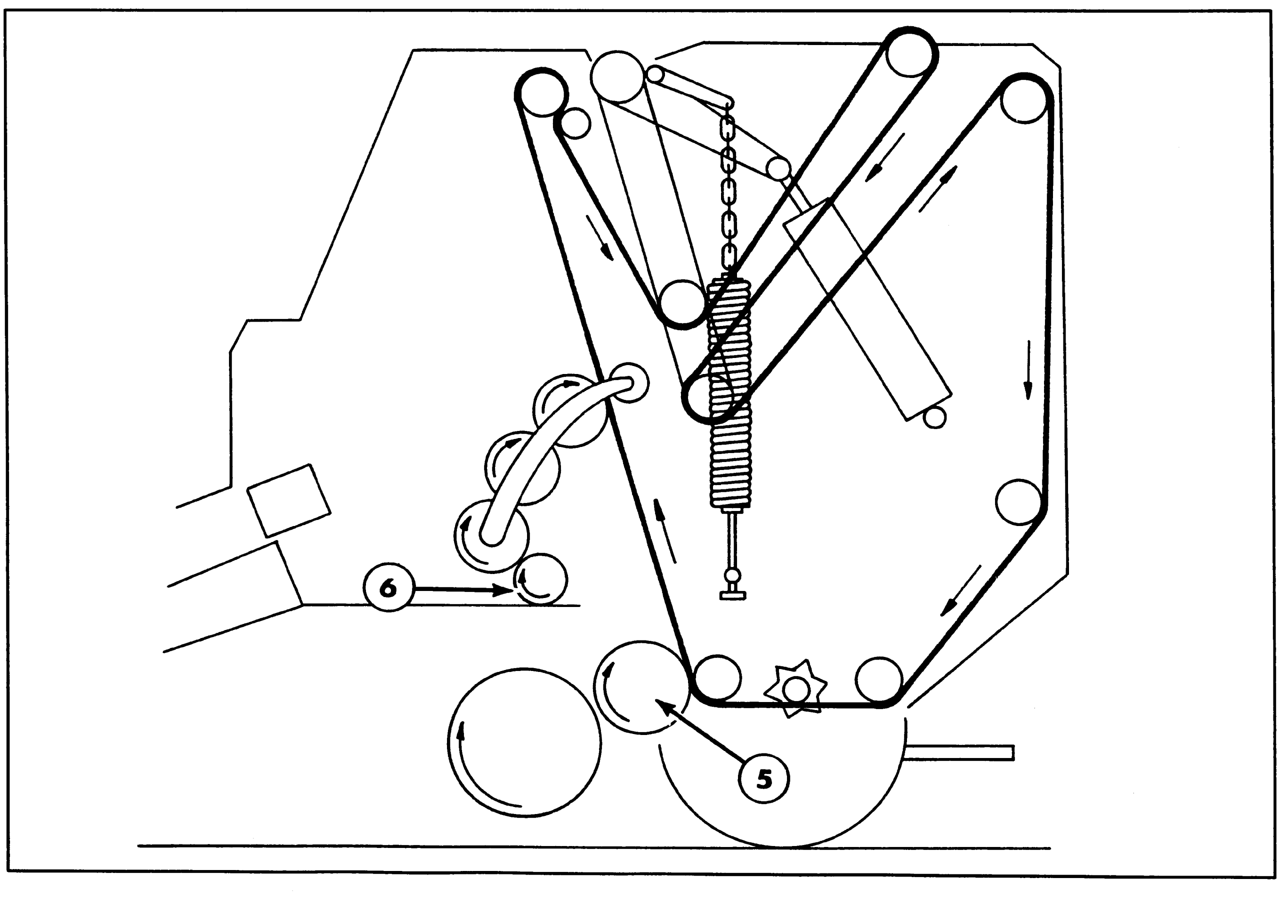


Figure 6-1

FLOOR ROLL REMOVAL

The pickup assembly must be removed to gain access to the floor roll. The pickup assembly must be removed. The figures in this section show removal of the standard pickup. Wide pickups are similar.

Removal of Pickup from Baler

1. Remove the shield and drive chain, 1, from the left-hand side of the baler. See Figures 6-2 and 6-3.
2. Loosen and remove the flotation springs from each side of the baler at 2, Figure 6-3.

   NOTE: The Model 634 has a single spring on the right-hand side.

3. Lower the pickup to field operating position. Disconnect the lift cable at 3, Figure 6-2, on the Model 634. On larger models, disconnect the lift link at 3, Figure 6-3, and the wind guard link at 4. With a floor jack, support the rear of the pickup. Loosen and remove the cap screws at 5, Figures 6-2 and 6-3. The pickup can now be removed from the baler.

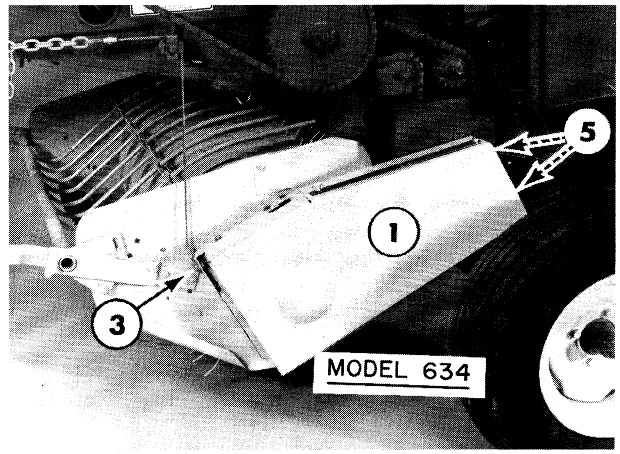


Figure 6-2

A3968-1

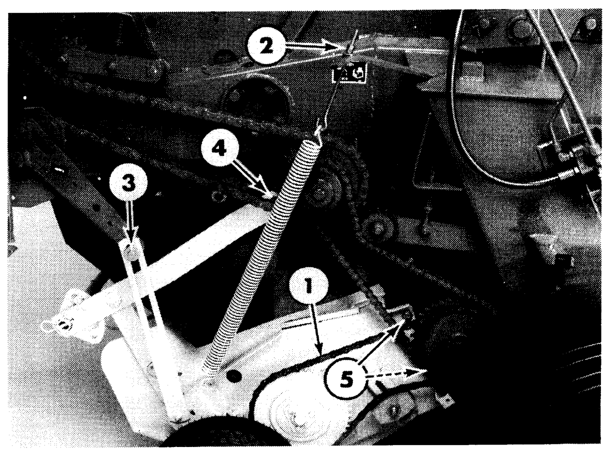


Figure 6-3

2375-10

Loosen the tension from the floor roll drive chain at 1, Figure 6-4 or 6-5. Remove drive chain, 2, and the sprocket assembly at 3. On the Model 664, remove key, 4; shim washers, 5; and lock collar, 6. See Figure 6-6.

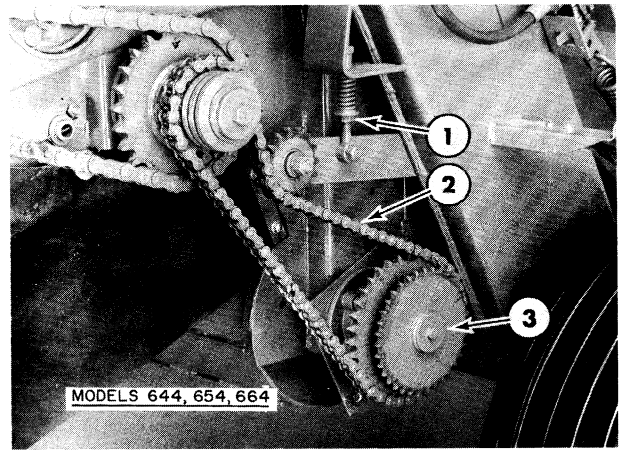


Figure 6-4

2378-8

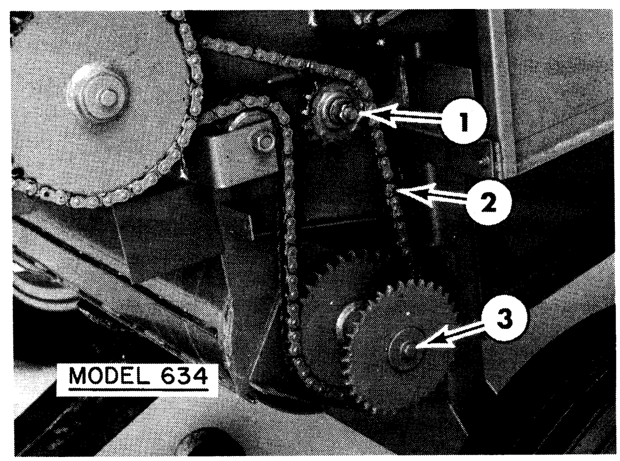


Figure 6-5

2508-5

NOTE: The Model 664 uses a woodruff key. The Models 634 and 644 use a tapered spline.

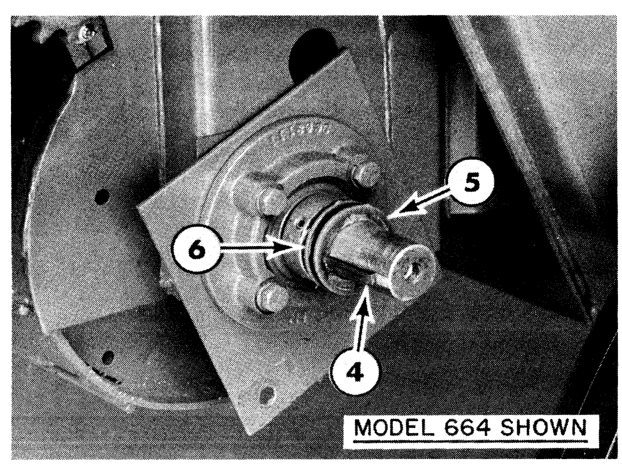


Figure 6-6

2378-6

Position a floor jack under the floor roll. Remove the cap screws at 7, Figure 6-7 or 6-8. Remove the bearing and housing, pivot plate, 8, and wear plate and special washer from the roll shaft.

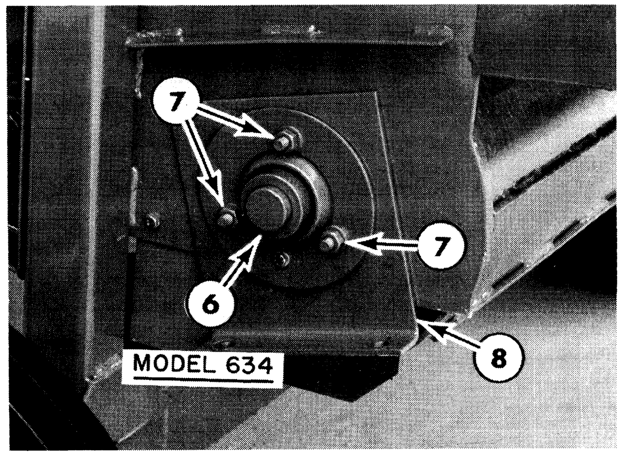


Figure 6-7

2588-12

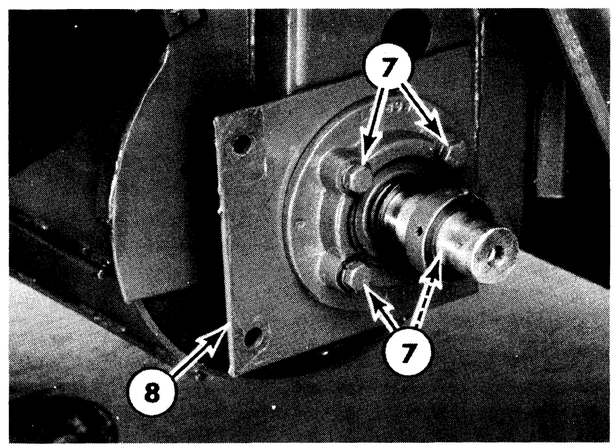


Figure 6-8

2378-5

On the right-hand side, remove lock collar, 6, and the cap screws securing the bearing flangettes, 7, Figure 6-9 or 6-10.

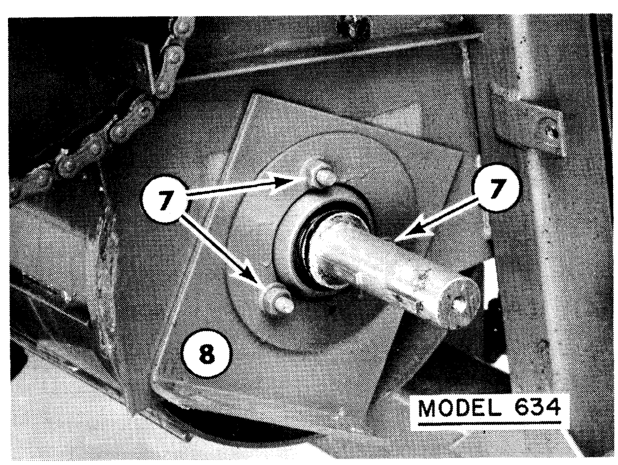


Figure 6-9

2508-7

Remove outer ring, 10, pivot plate, 8, and bearing components.

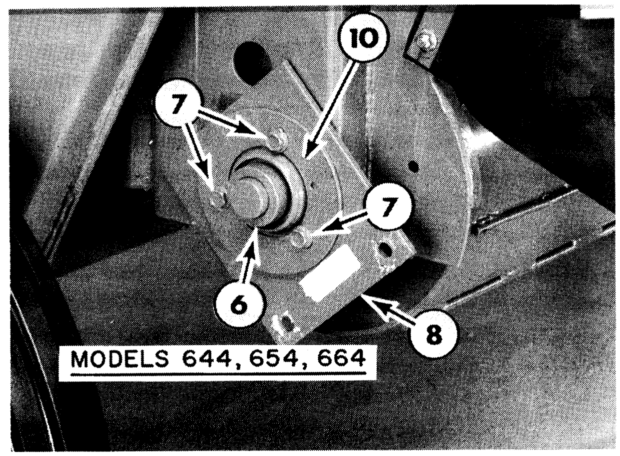


Figure 6-10

2378-1

Figures 6-11 and 6-12 show the components which secure the right side of the floor roll.

6 - Lock collar
8 - Pivot plate
10 - Outer ring
12 - Flangettes (2)
13 - Bearing
14 - Shield

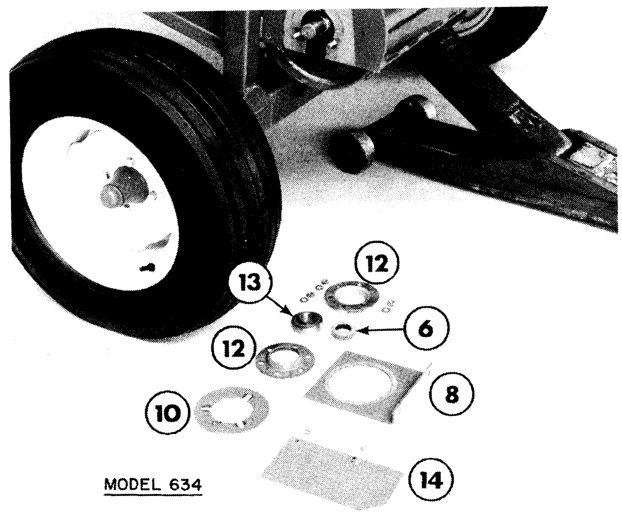


Figure 6-11

2508-6

6 - Lock collar
8 - Pivot plate
9 - Outer ring
10 - Inner ring
11 - Flangettes (2)
12 - Bearing
13 - Wear plate

Lower the jack and remove the floor roll assembly.

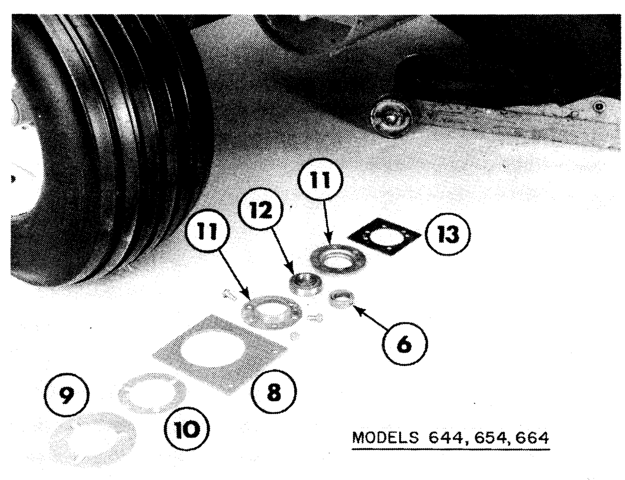


Figure 6-12

2378-11

INSPECTION

Examine the floor roll shafts for damage and replace if required. Inspect the bearings for signs of roughness or damage to the grease seals. Replace if questionable.

On the larger models, if the left-hand bearing housing assembly has been damaged, the bearing and housing assembly should be replaced. If only the bearing is damaged, replace with part #52443. Replace the bearing by rotating the outer race into the notched area of the housing, as shown in Figure 6-13.

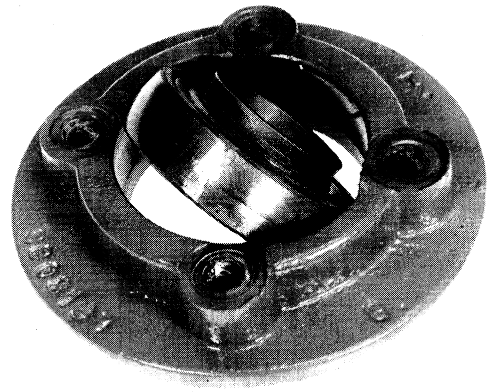


Figure 6-13

2378-10

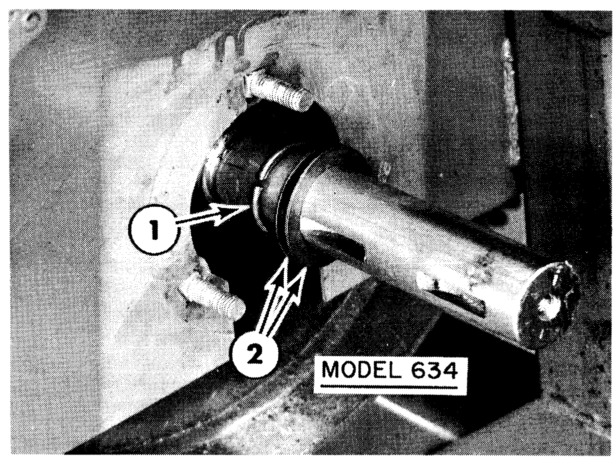


Figure 6-14

2508-10

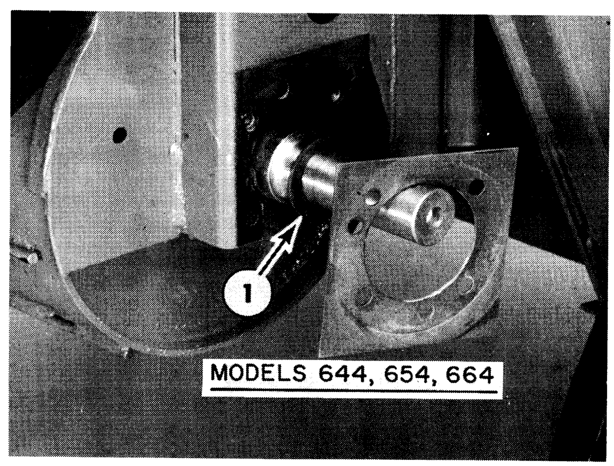


Figure 6-15

2378-12

ASSEMBLY

Position the roll into the main frame, as shown in Figures 6-14 and 6-15.

Install the special washer on the shaft, 1, Figures 6-14 and 6-15.

Center the roll in the main frame within 1/8″ (3 mm). On the Model 634, add shim washers at 2 as required to maintain roll location after the bearing assembly is secured. Coat mating surfaces with grease prior to installation. Complete the assembly process in reverse of the removal sequence.

Position the pickup assembly back to align the frame mounts. Using a floor jack, raise the rear of the pickup to align with the frame attaching mounts and secure with cap screws. Torque the M12 cap screws and nuts to 72 ft. lbs. (97 N·m).

Reinstall the pickup lift linkage. Raise the pickup and install the flotation springs to each side. Adjust the flotation springs evenly. Adjust the tension on the springs to provide the correct flotation, depending on model.

634 -	40 ± 10 lbs. (18 ± 5 kg)
644, 654, 664 Standard -	50 ± 10 lbs. (23 ± 5 kg)
644, 654 Wide Pickup -	100 ± 10 lbs. (46 ± 5 kg)

Install the drive chains and adjust as shown in Figures 6-16 through 6-18, depending on model and pickup designation.

Reinstall the wind guard linkage and replace all shields.

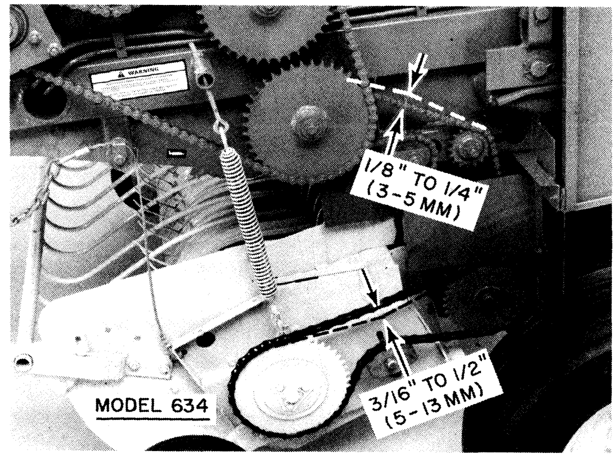


Figure 6-16

9641-3

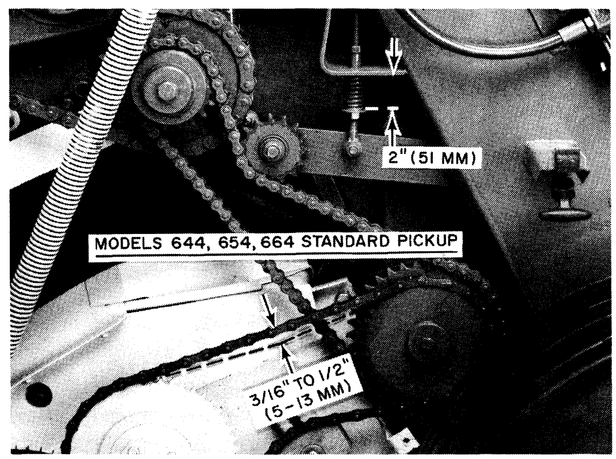


Figure 6-17

2375-8

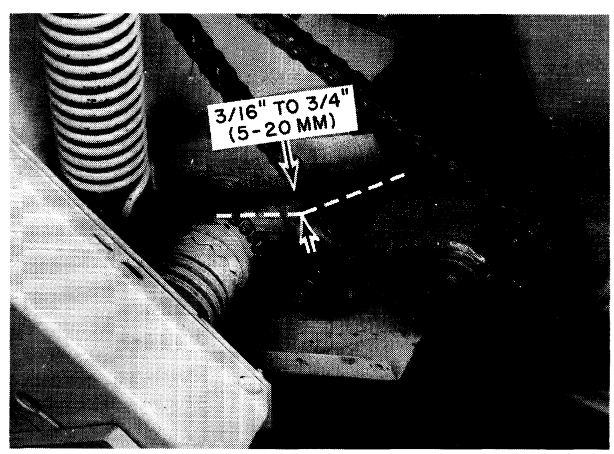


Figure 6-18

A1083-7

MODEL 634

STARTER ROLL REMOVAL

1. Remove knife assembly, 1, by removing bolts, 2.

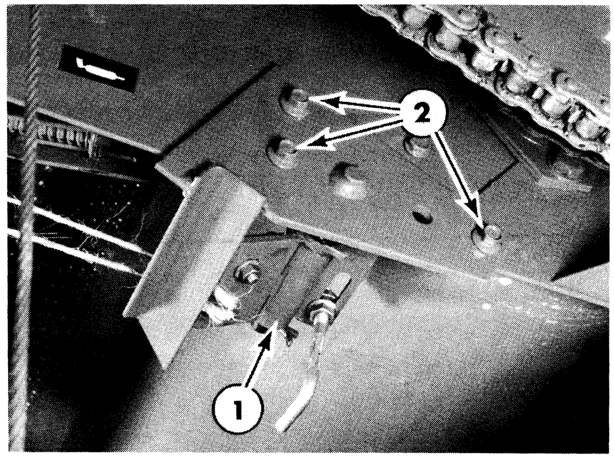


Figure 6-19

A3969-2

2. Remove drive chains, 1, and sprocket, 2.

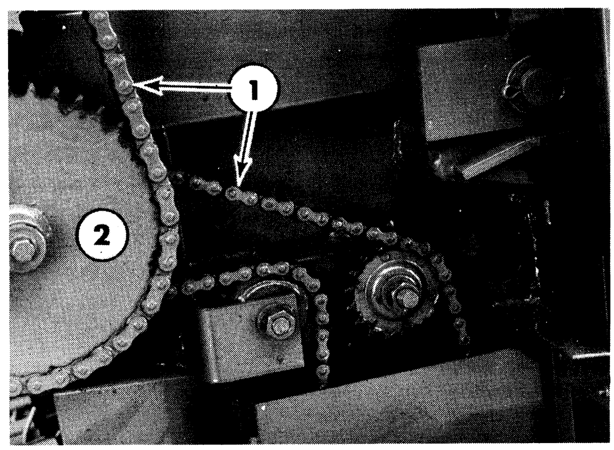


Figure 6-20

3. Remove key, 1, and shims, 2.
4. Support the starter roll and remove cap screws, 3. The bearing and flangettes, 4, can now be removed.

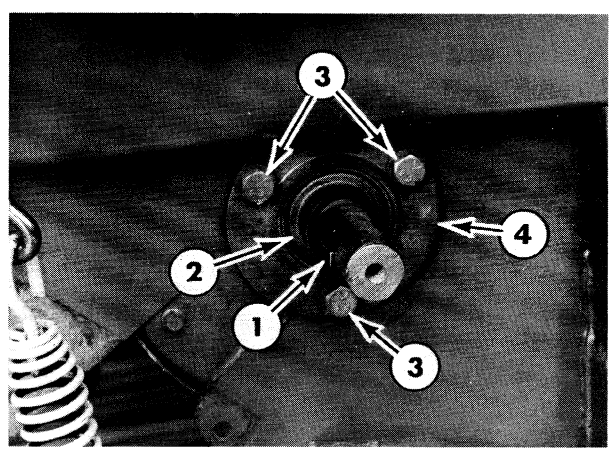


Figure 6-21

5. On the right side, remove lock collar, 1, and cap screws, 2. Remove flangettes and bearing, 3. The roll can now be removed through the front of the baler.

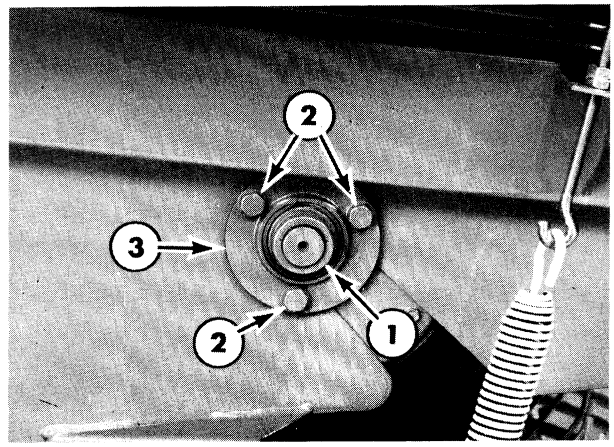


Figure 6-22

STARTER ROLL INSTALLATION

1. Slide the roll assembly into the baler. On the right-hand side, install the bearing assembly at the shaft. Use a longer bolt at 1 and drift punch, 2, to assist in installing bolt, 3.

   NOTE: Be sure to position the end shield with the screw exposed in the slot as shown. The purpose of the screw is to be able to rotate the shield to align the holes for the bolts.

2. Install the remaining hardware and lock collar. Do not tighten at this time.

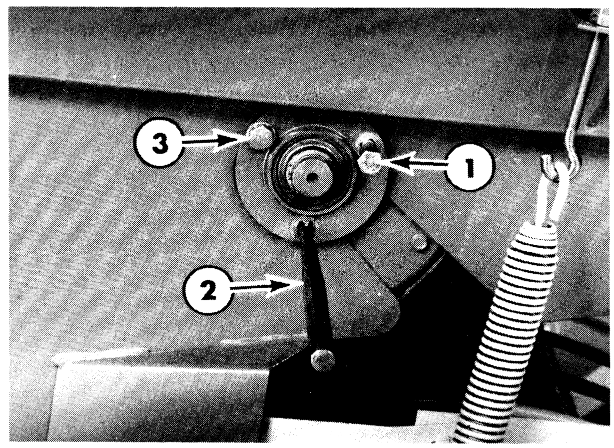


Figure 6-23

3. Install the left-hand bearing, 1, and hardware, 2. Do not tighten the hardware at this time. Install the same number of shims at 3 that were removed in disassembly. Install woodruff key, 4.

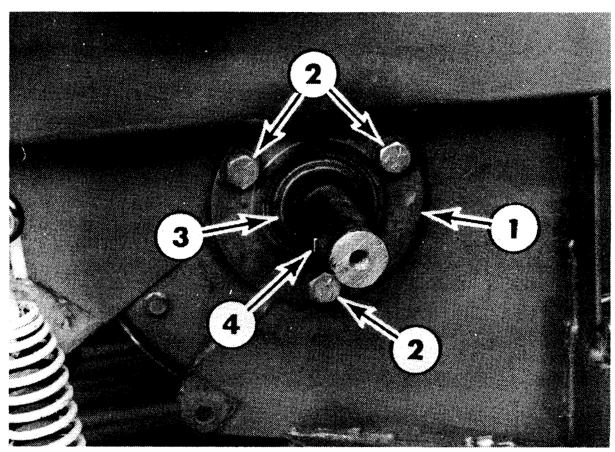


Figure 6-24

4. Install sprocket, 1, Figure 6-25, and tighten center bolt, 2. Rotate the roll to make certain the sprocket is seated.
5. Torque the bolts at 2, Figure 6-24, to 37 ft. lbs. (52 N·m).
6. Torque the bolts at 2, Figure 6-22, to 38 ft. lbs. (52 N·m).

   Tighten lock collar, 1, Figure 6-22.
7. Check the alignment of sprockets, 1 and 3, Figure 6-25. Add or remove shims at 3, Figure 6-24, to align the sprockets within 1/16″ (1.5 mm).
8. Install drive chain, 4, Figure 6-25, and adjust it to deflect 1/8″ - 1/4″ (3 mm - 5 mm).
9. Install drive chain, 5, Figure 6-25, and adjust spring, 6, to length of 1-5/8″ (41 mm).
10. Install the knife assembly.

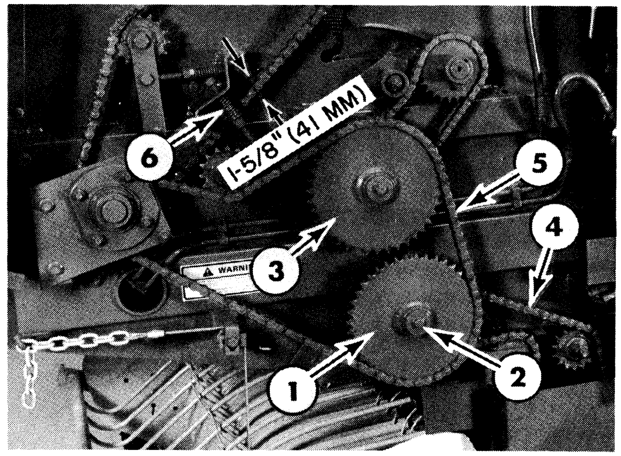


Figure 6-25

A3968-6

MODELS 644, 654, AND 664

STARTER ROLL REMOVAL

1. Loosen and remove flotation spring, 1, and drive chains, 2.
2. Loosen and remove the cap screw at 3. Remove the jaw clutch assembly.
3. Remove the bearing lock collar and set aside.

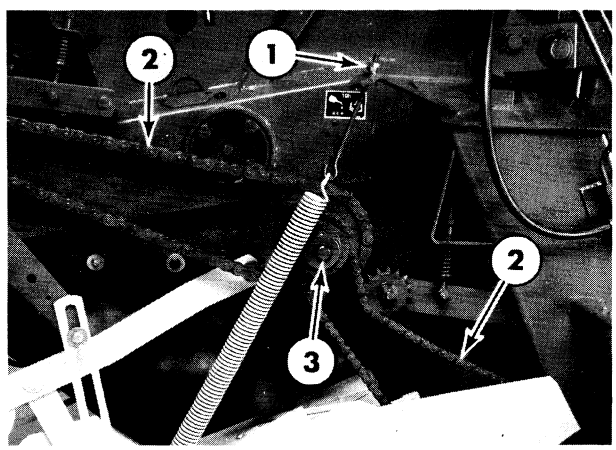


Figure 6-26

2351-7

4. Loosen, but do not remove, the cap screws at 4.

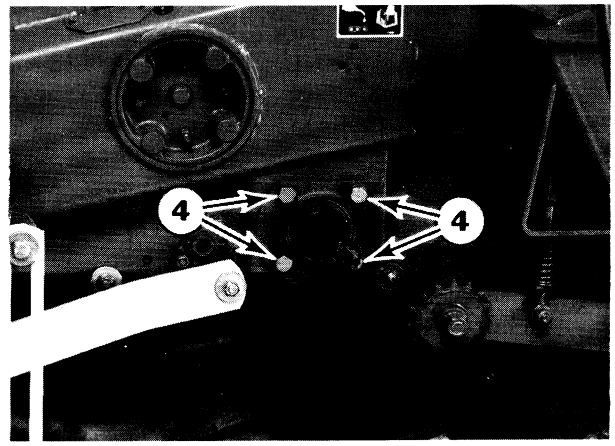


Figure 6-27

2351-6

5. On the right-hand side, loosen and remove the pickup flotation spring at 1. Removal of this spring is not necessary on wide pickup models.
6. If equipped with Auto-Wrap, remove the belt at 2. Loosen and remove the drive chain at 3.
7. Remove the cap screw and sprocket assembly at 4.

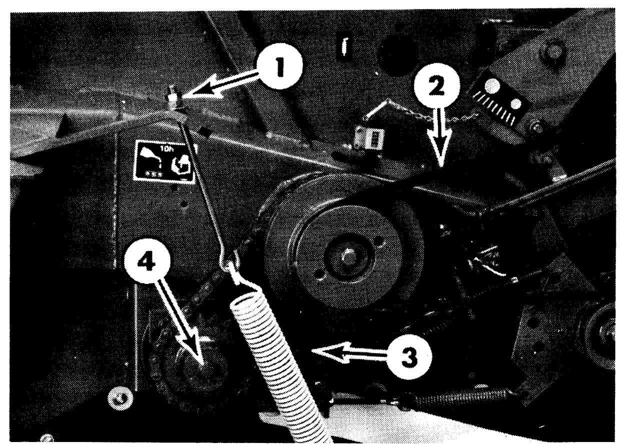


Figure 6-28

2351-5

8. Disconnect the springs at 5. Remove the three cap screws at 6 and set aside the bracket assembly, 7.

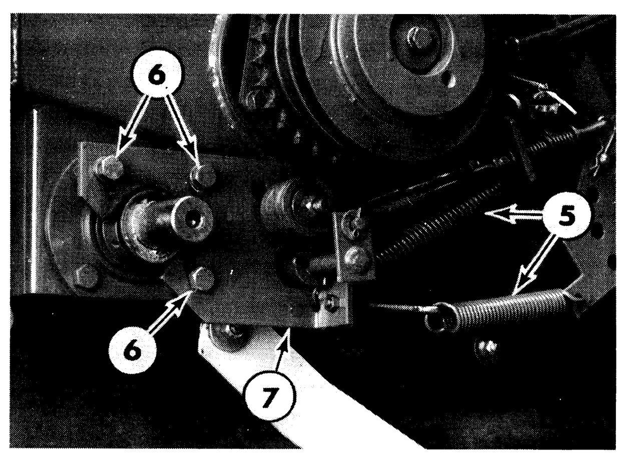


Figure 6-29

2351-12

9. On models with standard width pickups, remove the wind guard and the rear three cap screws at 8. Fold the rubber flap forward out of the area.
10. Remove the remaining cap screw and nut at 6. Remove the bearing and flangette from the starter roll shaft.

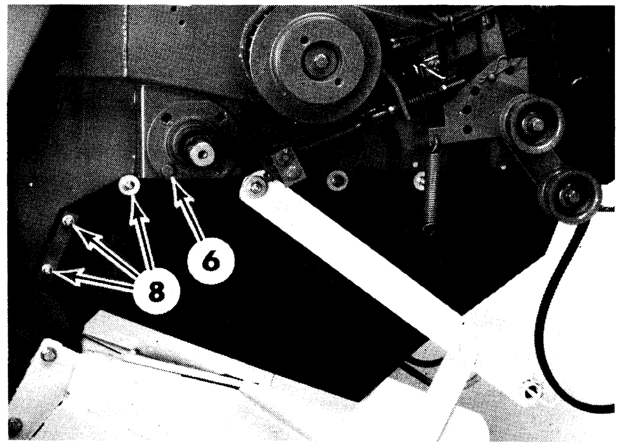


Figure 6-30

2351-11

11. Support the starter roll and remove cap screws, 9. On the left end, remove the bearing and flangettes.

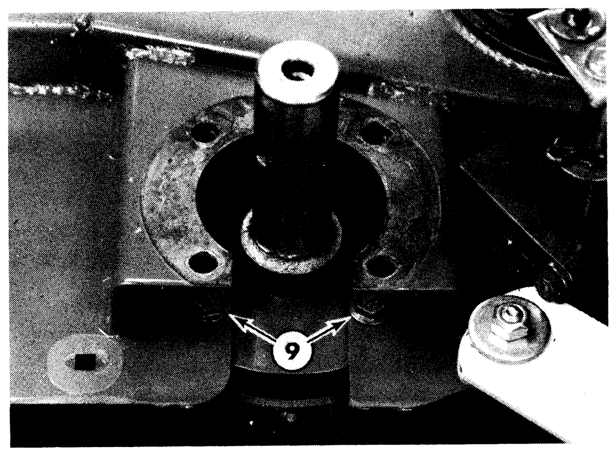


Figure 6-31

2352-1

12. Remove the starter roll, as shown in Figure 6-32.

NOTE: On wide pickup models, it may be necessary to elevate the hitch to gain sufficient access for roll removal.

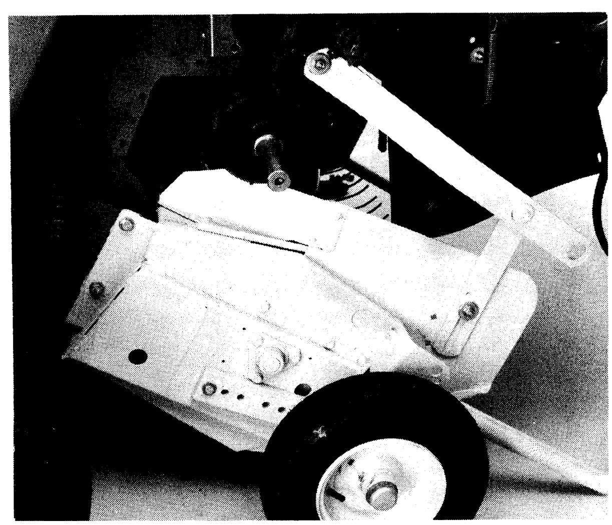


Figure 6-32

INSPECTION

Figure 6-33 shows the components which make up the starter roll assembly.

1 - Starter roll
2 - Sprocket
3 - Washer
4 - Lock collar
5 - Bracket assembly
6 - Spacers (3)
7 - Flangettes (2)
8 - Bearing
9 - Ring
10 - Floor roll clutch assembly
11 - Sprocket
12 - Lock collar
13 - Flangettes (2)
14 - Bearing
15 - Special washer

Examine the starter roll shafts for damage and replace if required.

Inspect the bearing for signs of roughness or damage to the grease seals. Replace if questionable.

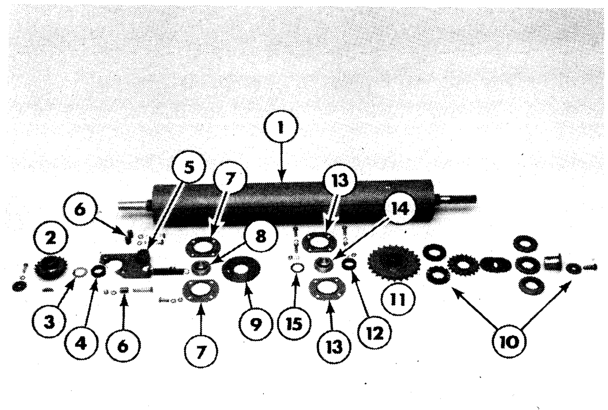


Figure 6-33

INSTALLATION

To install, reverse the removal sequence. Position the starter roll in the frame. Coat the mating surfaces of the shaft and bearing bores with antiseize.

Install trash ring, 9, Figure 6-33, over the right-hand end of the shaft and secure to the main frame. Torque the M10 cap screws to 41 ft. lbs. (56 N·m). See Figure 6-31.

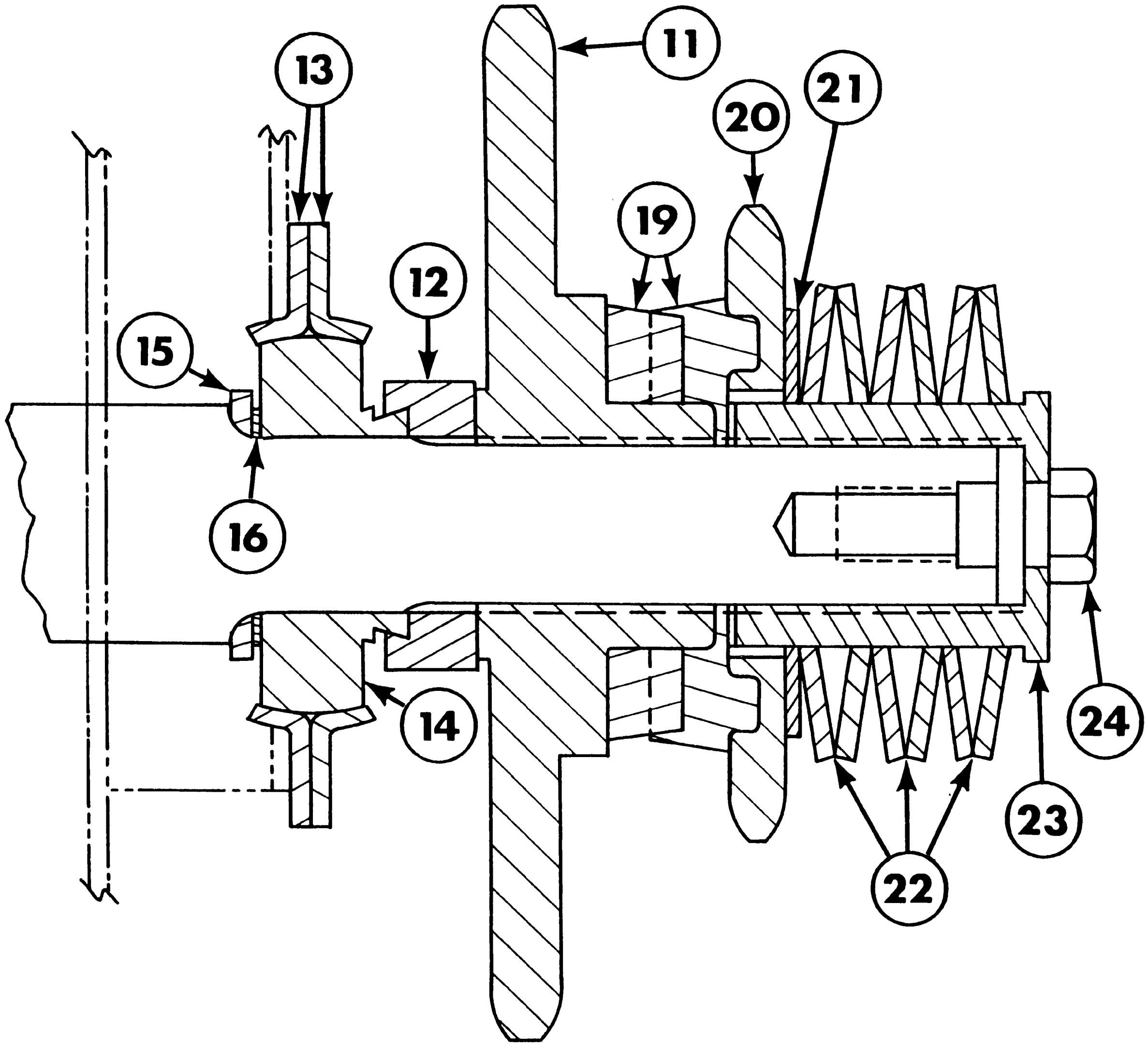


Figure 6-34

On the left-hand side, install special washer, 15, on the shaft.

If the original roll had a shim washer at 16, install as shown. Because of variations in frame width, you may require from 0 to 3. Loosely install the bearing and flangettes, 13 and 14, to the frame.

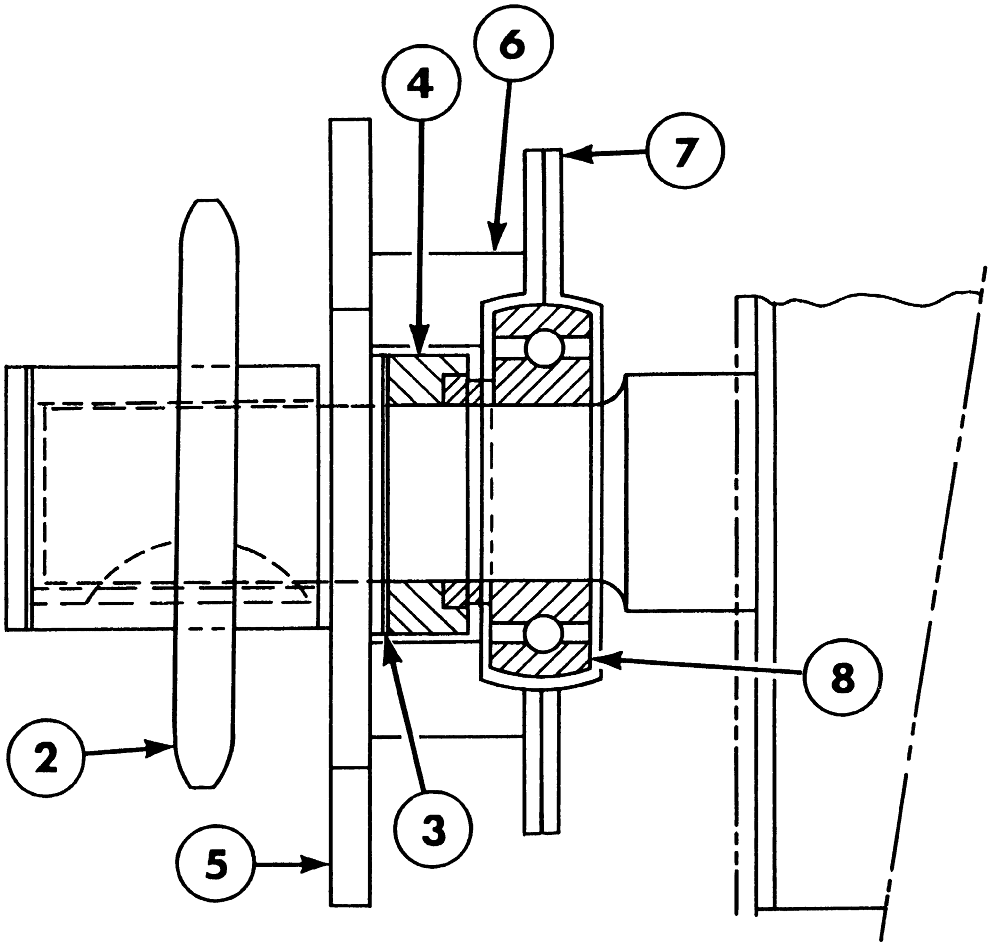


Figure 6-35

On the right side, install bearing, 8; flangettes, 7; and lock collar, 4, on the starter roll shaft. Install the M12 x 30 cap screw and nut at 17, Figure 6-36. Install bracket assembly, 5; spacers, 6; and M12 cap screw, Figures 6-33 and 6-35, to the frame. Torque the M12 hardware to 72 ft. lbs. (97 N·m). Repeat on the left-hand side. Recheck that the starter roll is centered properly and set lock collars, 4, Figure 6-35, and 12, Figure 6-34.

Install the shim washer previously removed at 3, Figures 6-35 and 6-37. Slide sprocket assembly, 2, Figure 6-35, on the shaft to check sprocket alignment with sledge roll clutch, 18, Figure 6-37. Add shim washers #28581, as required, at 3 for proper alignment.

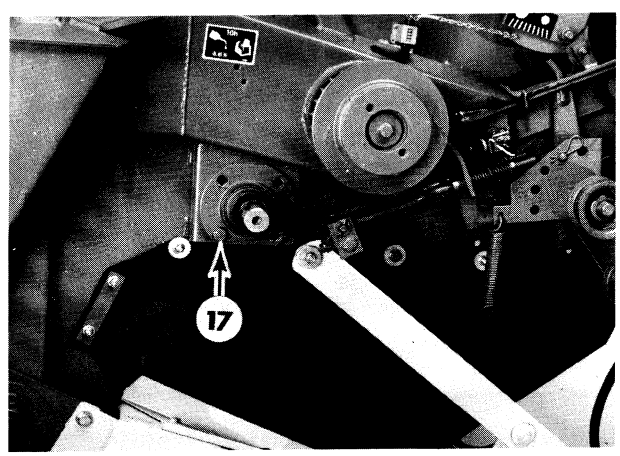


Figure 6-36

2351-11

Install woodruff key in shaft, install sprocket, 2, Figure 6-35, and torque cap screw to 41 ft. lbs. (56 N·m). Replace the rubber flap and hardware. Install the wrapper springs at 5, Figure 6-37.

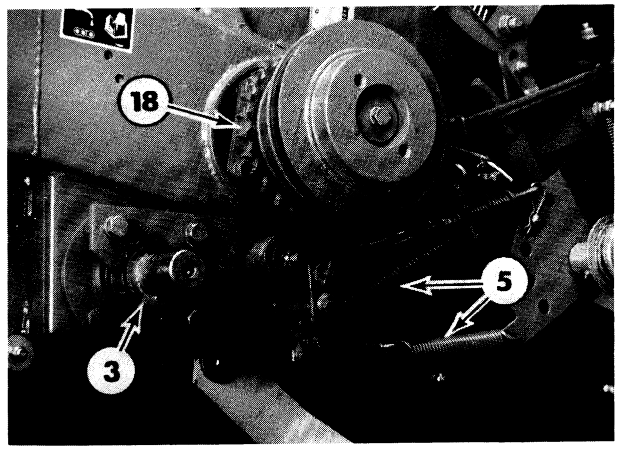


Figure 6-37

2351-12

Reinstall the drive chain and adjust to 1/8″ - 5/16″ (3 mm - 8 mm) as shown in Figure 6-38.

Replace the Auto-Wrap drive belt. If the flotation spring was removed, replace to approximate location.

On the left-hand side, replace sprocket, 11, Figure 6-34. Inspect floor roll clutch jaws, 19, Figure 6-34, for excessive wear. Replace if questionable. Apply a light coat of grease to the clutch jaws and install. Sub-assemble clutch components 21 through 24 and install on the starter roll shaft. Apply Loctite 242 to cap screw, 24, Figure 6-34, and torque to 177 ft. lbs. (240 N·m). See Section 5 for checking the floor roll clutch.

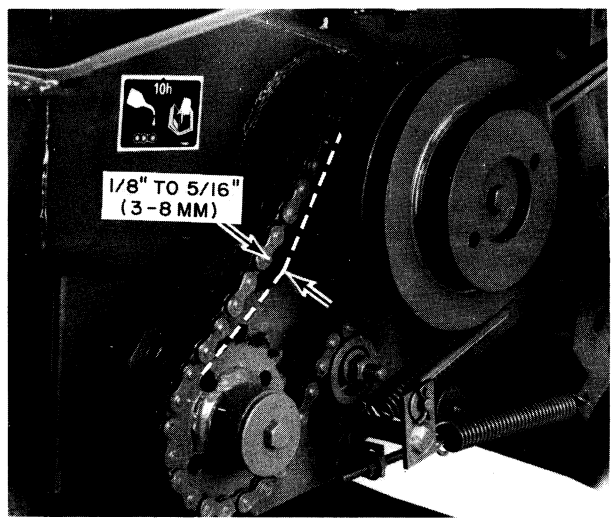


Figure 6-38

A1055-12

Reinstall the drive chains and adjust to 2″ (51 mm). Replace the pickup flotation spring and adjust pickup flotation at 1 to 50 ± 10 lbs. (23 ± 5 kg) on standard units; 100 ± 10 lbs. (45 ± 5 kg) on wide pickup units.

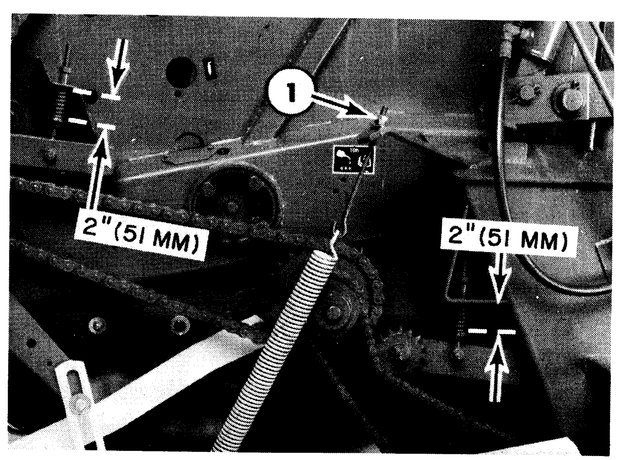


Figure 6-39

2351-7

MODEL 644

BALE SLICE KNIFE CARRIAGE AND ROLL ASSEMBLY

Because of the weight of the bale slice roll assembly, it is necessary to disassemble many of the components before removing the center shaft from the baler.

Raise the tailgate and secure the tailgate lock valve. Remove the knives, 1, from each Bale Slice position.

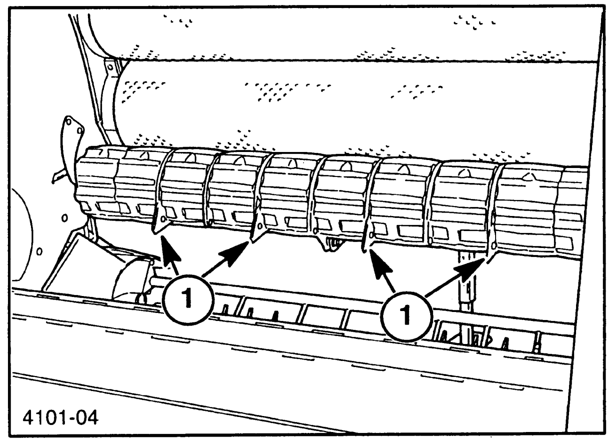


Figure 6-40

A4101-04

Number each half of every roll segment and remove the segments from the shaft.

NOTE: Each roll segment is cut in half after machining and will not match any other roll segment. If only replacing the knife carriage weld assembly, not all roll segments must be removed.

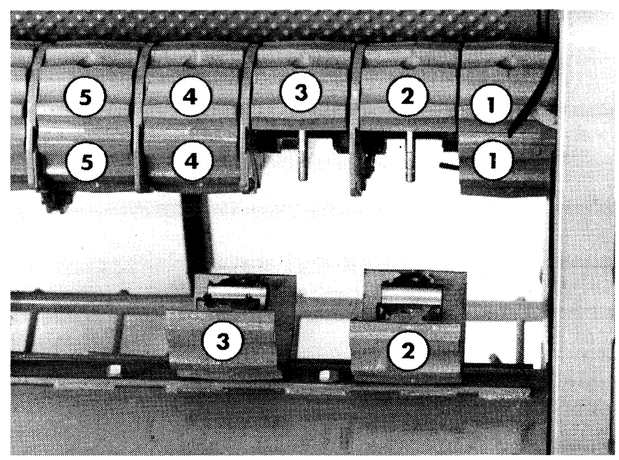


Figure 6-41

A4101-13

Disconnect the clevis from the carriage at 1, Figure 6-42, by removing the M12 x 50 cap screw. Remove the cap screws on the center plate, 2, and the outside tie straps at 3.

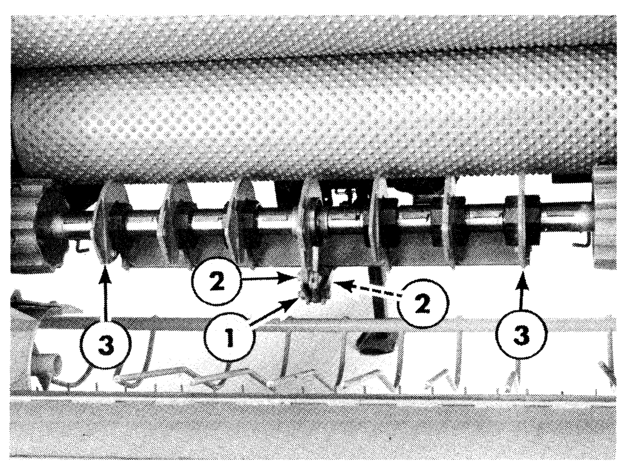


Figure 6-42

A4102-4

Shift the carriage weld assembly to one side, off the center bearing and bushing blocks, 4. Remove the carriage assembly from the baler.

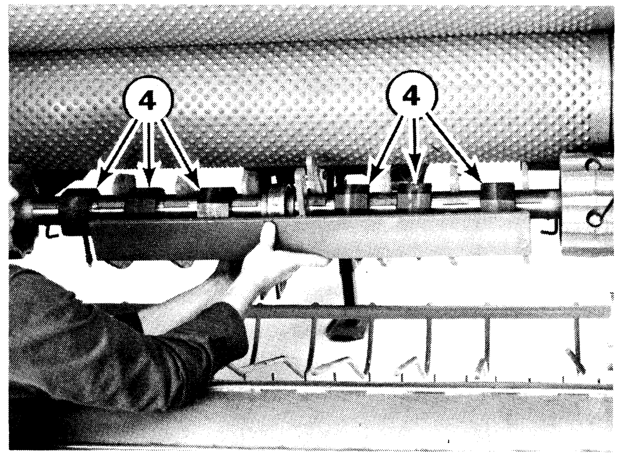


Figure 6-43

A4102-3

To complete the removal of the shaft from the baler, follow Steps 1 through 12 and related Figures 6-26 through 6-32.

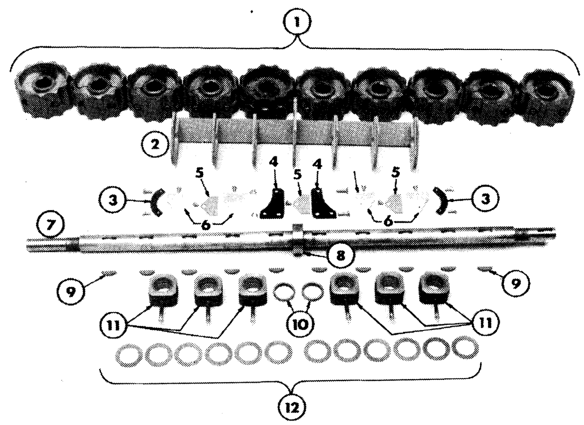


Figure 6-44

A4343-2

INSPECTION

Figure 6-44 shows the components which make up the starter roll assembly.

1 Roll segment assembly (10)
2 Knife carriage weld assembly
3 Tie strap (2)
4 Plate (2)
5 Blanks (3 shown - 7 total)
6 Knives (4 shown - 7 total)
7 Shaft
8 Bearing
9 Woodruff keys (10)
10 Spacer (2)
11 Block assemblies (6)
12 Plastic washers (12)

Inspect the bearing, 8, and the bushings inside the block assemblies, 11. Replace if questionable.

INSTALLATION

If the roll shaft, 7, or the bearing, 8, require replacement, locate the bearing on the shaft as shown in Figure 6-45.

NOTE: Use an ink marker, not a sharp line, on the shaft to locate the bearing.

Secure the bearing to the shaft, using Loctite 609 or its equivalent.

Install the spacers, 10, on each side of the center bearing. Install three block assemblies with plastic washers on each side of the center bearing. Replace the roll shaft assembly in the baler in the reverse of the removal sequence. Follow text and Figures 6-34 through 6-39.

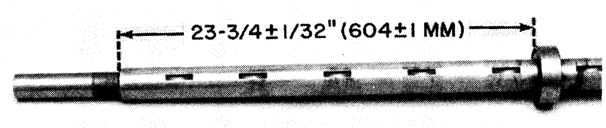


Figure 6-45

A4343-8

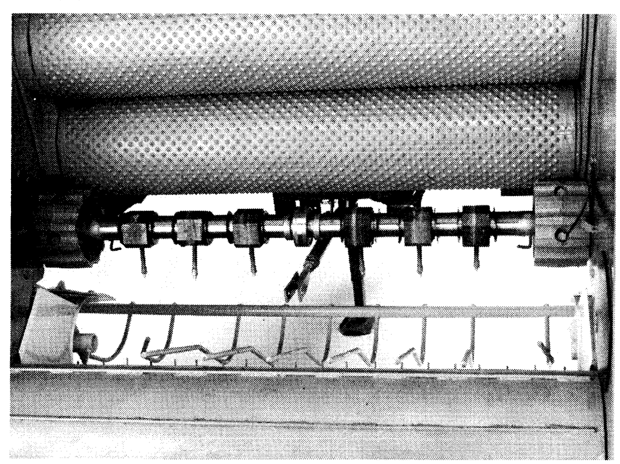


Figure 6-46

A-4102-2

Install the ten woodruff keys into the roll shaft. Install the outer two roll segments with 1/8″ (3.2 mm) clearance between segment and main frame. Do not tighten at this time. Install the knife carriage as shown in Figure 6-47, replacing the tie straps, 3, and the center plates, 2. Replace the M12 x 50 cap screw and locknut securing the knife carriage to the clevis.

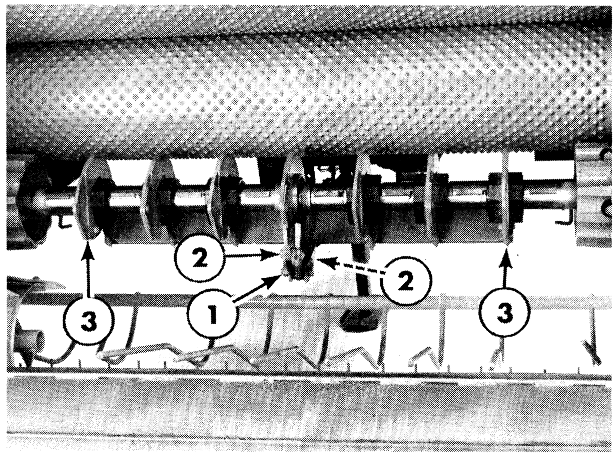


Figure 6-47

A4102-4

Install the remaining roll segments as shown in Figure 6-48. After tightening the M12 x 120 cap screws and locknuts, be sure the gap between the mating halves does not exceed 1/64″ (1 mm). Rotate the roll assembly to insure there is no contact with the knife carriage or the main frame. Torque the roll segments to 72 ft. lbs. (98 N·m).

Install the knives in the desired locations and secure with allen-head screws.

NOTE: Use antiseize lube on all knife hardware.

In any location where a knife is not installed, add the blank plate, 1, Figure 6-48, and hardware to reduce wear on the knife carriage. Lube the six grease fittings at 2, Figure 6-49, with multipurpose grease.

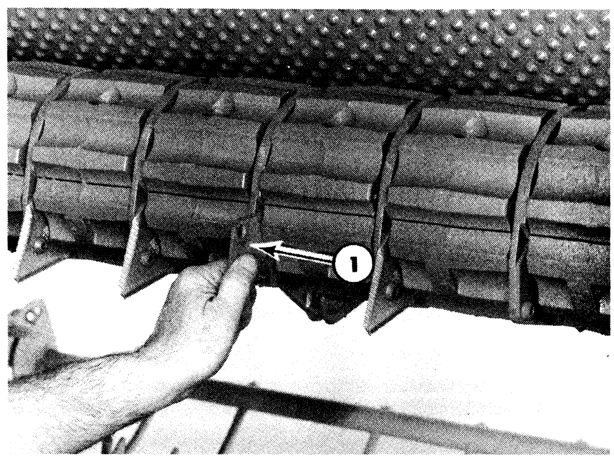


Figure 6-48

A4101-11

With the actuator completely retracted, check the clearance between the dimpled pivot roll and the knife carriage. It should be 1/4″-7/16″ (6 mm -12 mm). Rotate the clevis, 3, to obtain the recommended dimension.

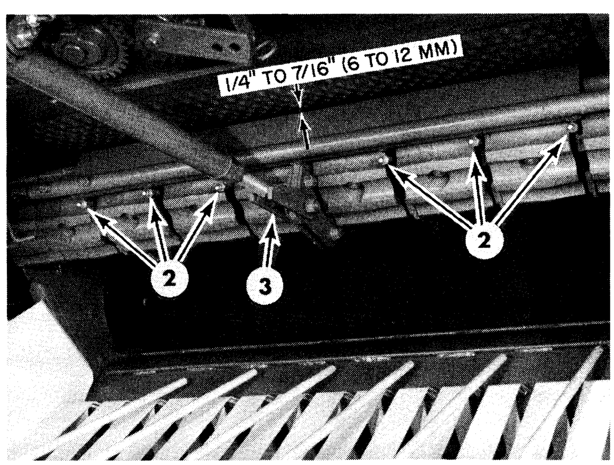


Figure 6-49

A4135-3

LABOR GUIDE

	HOURS
FLOOR ROLL - REMOVAL AND REPLACEMENT	
634	3.5
644	3.5
654	3.5
664	3.5
STARTER ROLL - REMOVAL AND REPLACEMENT	
634	2.0
644	3.0
654	3.0
664	5.0
BALE SLICE	
644 - Knife Carriage Removal and Replacement	5.0
644 - Shaft Replacement	8.0
644 - Knife Replacement Per Knife	0.2 per knife

INDEX

SECTION 7

APRON ROLL GROUP

This section deals with the removal and repair of rolls which come in contact with the apron belts.

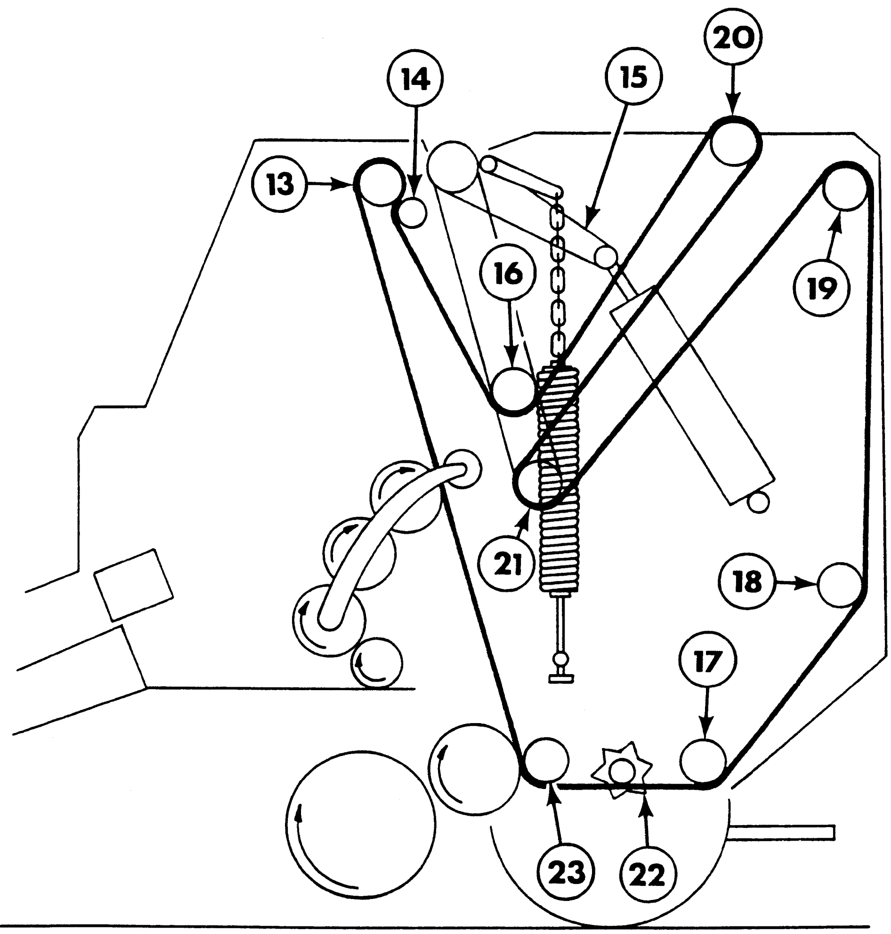


Figure 7-1

RELEASING BELT TENSION

Tension on the belts must be loosened to service the belts and rollers. To loosen the belts, open the tailgate:

Model 634

Raise the tailgate to full height and secure the safety lockouts. Open the left-hand shield and remove the 1″ (25.4 mm) diameter cap screw from its stored location and install as shown.

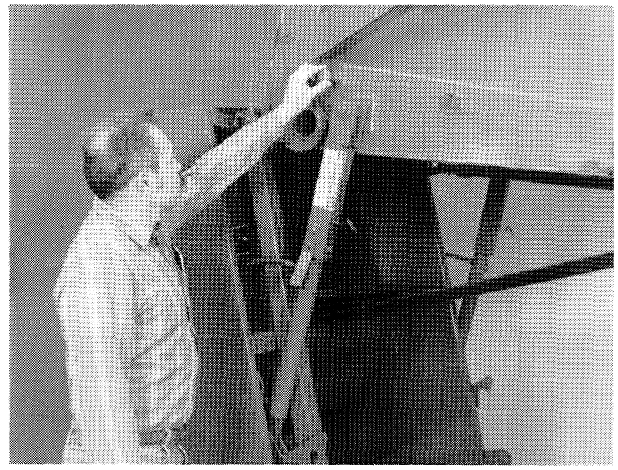


Figure 7-2

A3968-12

Return the lockouts to the stored position and lower the tailgate,1.

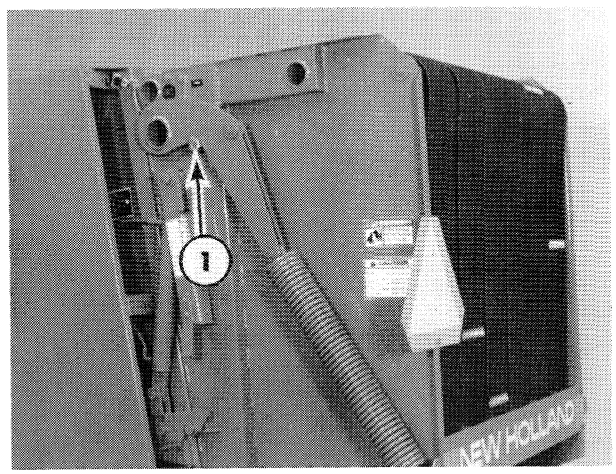


Figure 7-3

A3968-11

Model 644

Insert the bolt, stored on the left side pick-up flotation spring support, under the spring arm, 1.

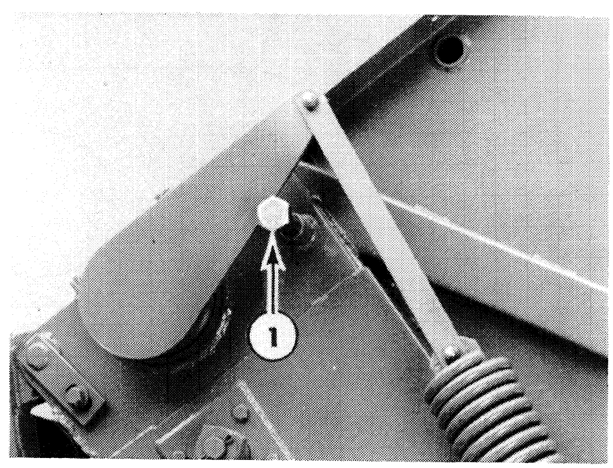


Figure 7-4

1495-3

Model 654 and 664

Pivot handle to engage pin at 1, under the take-up arm.

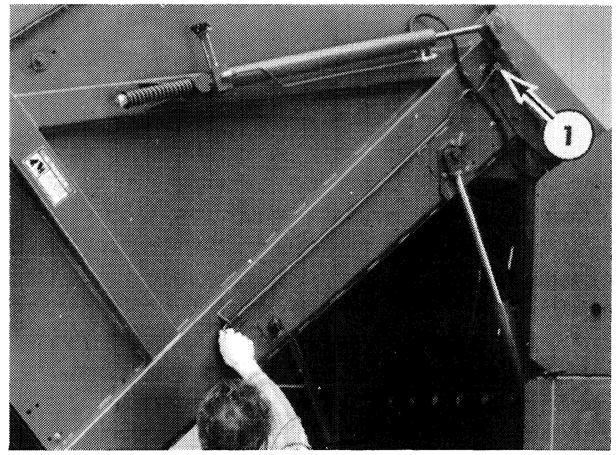


Figure 7-5

2361-11

IMPORTANT: If the tailgate is not fully closed, put the tailgate control valve, 1, in the upper locked position.

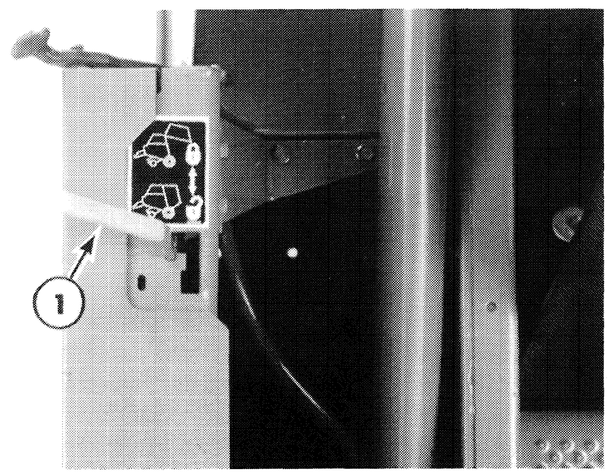


Figure 7-6

A3974-9

DRIVE ROLL REMOVAL

Models 634 and 644

1. Release the apron belt tension and remove the apron belts.

   NOTE: The drive roll can be removed without removing the belts if additional assistance is available for reassembly.

2. Remove drive chain, 1. Remove the center bolt and pull sprocket, 2, off the drive shaft.

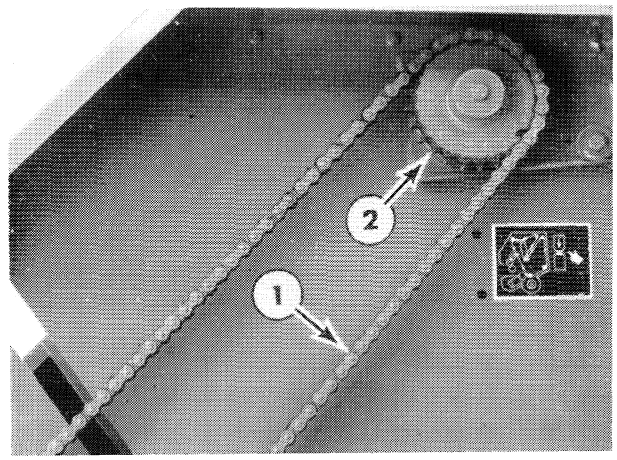


Figure 7-7

1021-4

3. Remove bolts, 1, retaining bearing housing, 2.

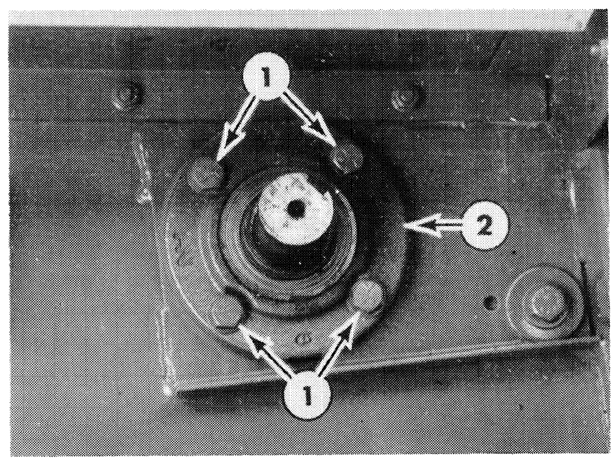


Figure 7-8

1021-2

4. On the right side, remove cap screw, 1, for the Model 634.

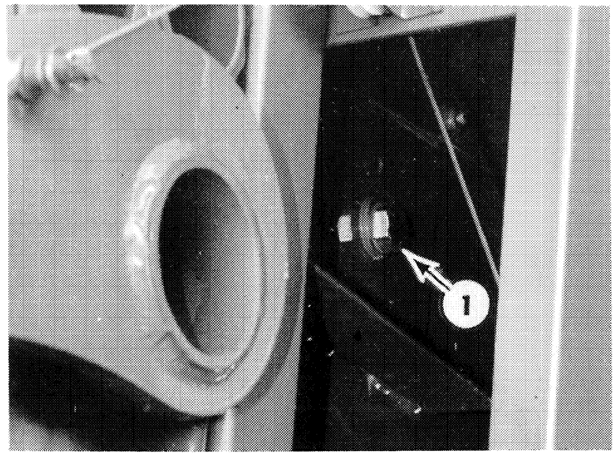


Figure 7-9

1020-8

For the Model 644, remove cap screw, 1, and hub, 2. The drive roll can now be lifted out of the baler.

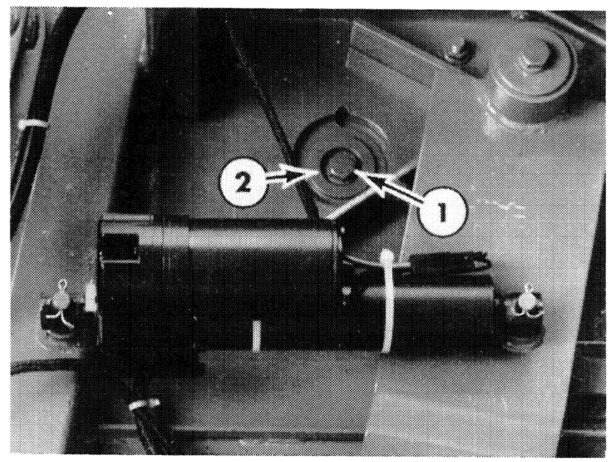


Figure 7-10

1636-8

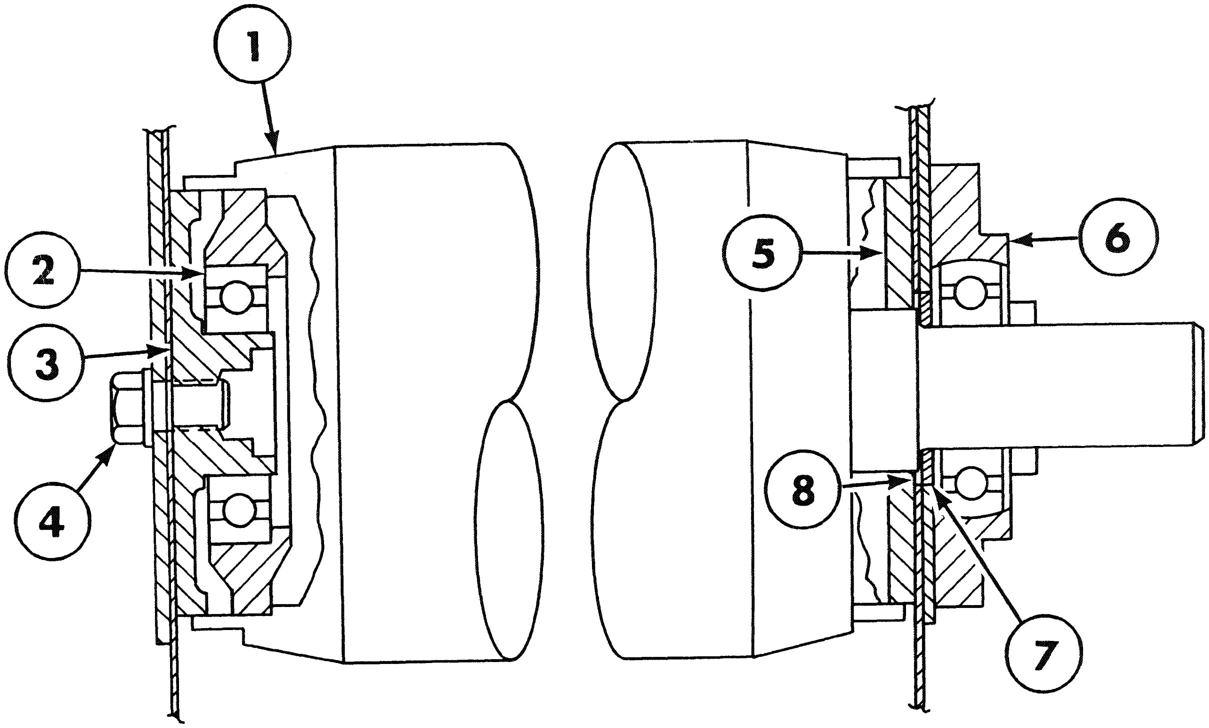


Figure 7-11

Inspection

Inspect the roll shafts for damage or wear which would affect bearing life. Check the rubber covering for gouges or cuts which could affect belt tracking. Replace if required. Figure 7-11 shows the component breakdown of the drive roll assembly in the Model 634.

1 - Drive roll assembly
2 - Bearing
3 - Support assembly
4 - M16 x 30 cap screw, lock washer, flat washer
5 - Ring
6 - Bearing housing assembly
7 - Washer
8 - Chamfered washer

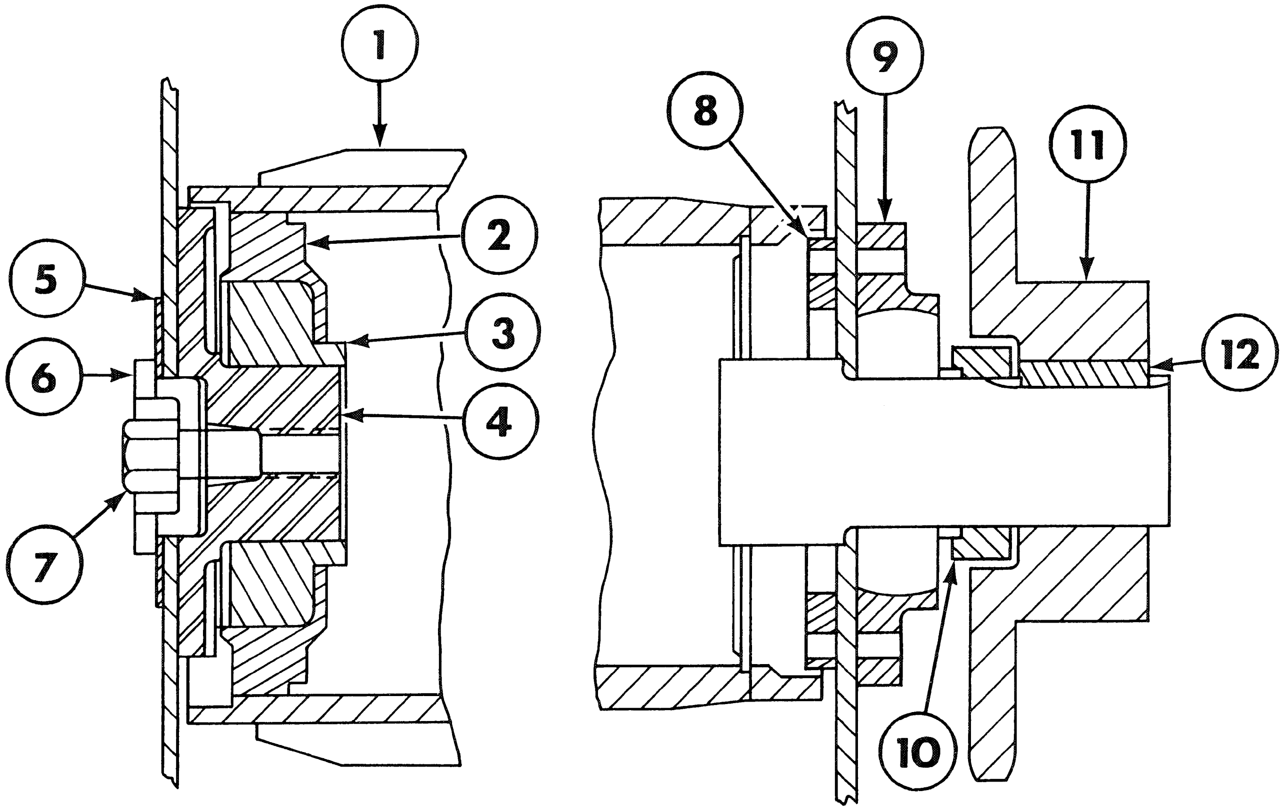


Figure 7-12

Figure 7-12 shows the component breakdown of the drive roll assembly in the Model 644.

1 - Drive roll
2 - Bearing housing
3 - Bearing
4 - Support A
5 - Washer
6 - End cap hub
7 - Cap screw M12 x 40
8 - Ring
9 - Bearing and housing
10 - Lock collar
11 - Sprocket
12 - Key

Installation

Install the roll in the reverse order of disassembly. Apply antiseize grease to the bearing and sprocket mounting.

Model 634

Make sure washer, 7, Figure 7-11, with the chamfer is installed next to the drive roll with the chamfer against the shoulder of the roll. Torque the M16 cap screw to 177 ft. lbs. (240 N·m). Torque the M10 bearing cap screws to 41 ft. lbs. (56 N·m).

Model 644

Torque the M12 x 40 cap screws to 74 ft. lbs. - 80 ft. lbs. (100 N·m - 108 N·m). Torque the M10 bearing cap screws to 41 ft. lbs. (56 N·m).

Install the key and sprocket. Check the alignment with all related sprockets and idlers. Tighten the setscrew to 34 ft. lbs. (46 N·m). Replace the drive chain and adjust the spring length as shown in Figure 7-13 or 7-14.

Models 634 and 644

Reinstall the apron belts and release system to tension belts.

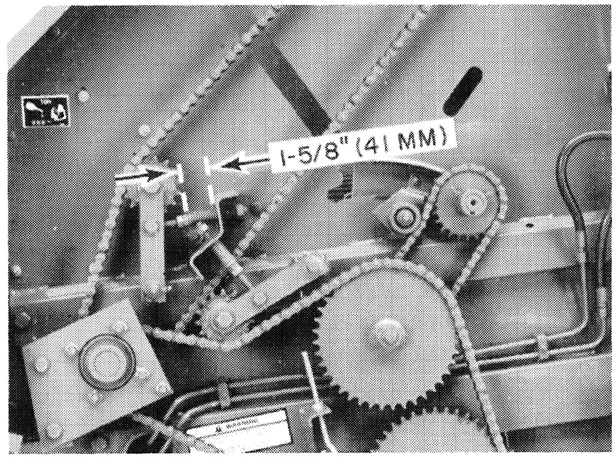


Figure 7-13

1461-8

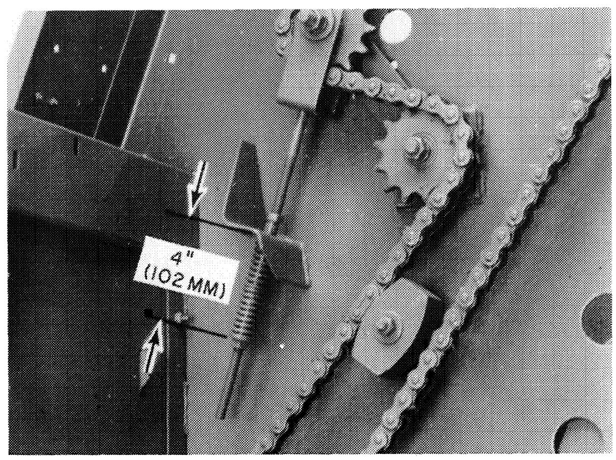


Figure 7-14

1493-7

DRIVE ROLL REMOVAL

Models 654 and 664

1. Release belt tension as previously described in this section. If the unit has laced belts, locate the lacing in a convenient location to disconnect the belts and fold away from the drive roll. If equipped with endless belts, obtain maximum belt slack to allow threading the roll under the belts.
2. Loosen and remove drive chain, 1, Figure 7-15. Disconnect the grease line at 2 and remove cap screw, 3, securing the end cap and spring. Remove outer clutch half, 4, from the roll shaft. Remove the snap ring and washer from the shaft.
3. Remove the pivot bolt at 5, and allow the fork weld assembly to be suspended by the spring.
4. Remove the four cap screws at 6. With a hoist or forklift, support the drive shaft. With a gear puller, engage the two detent areas on the bearing housing and remove the assembly from the shaft.

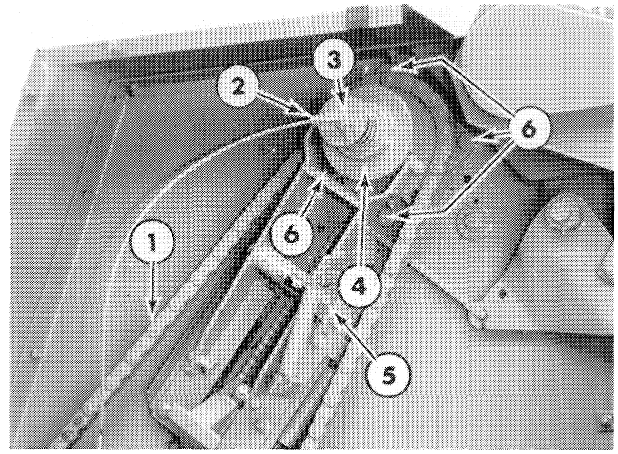


Figure 7-15

2545-5

5. On the right-hand side, remove cap screw, 1, and hub, 2.

   Remove the drive roll assembly from the baler.

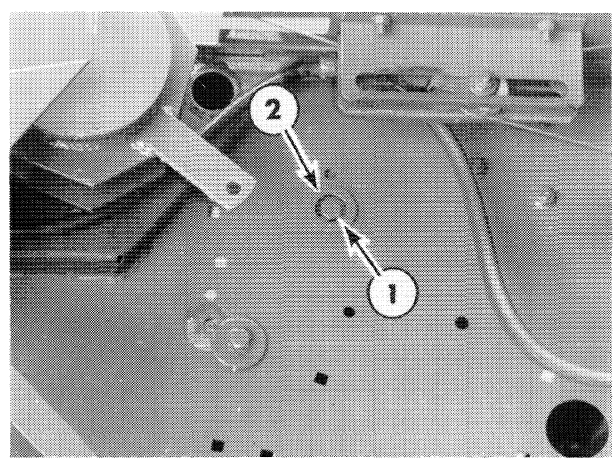


Figure 7-16

2346-6

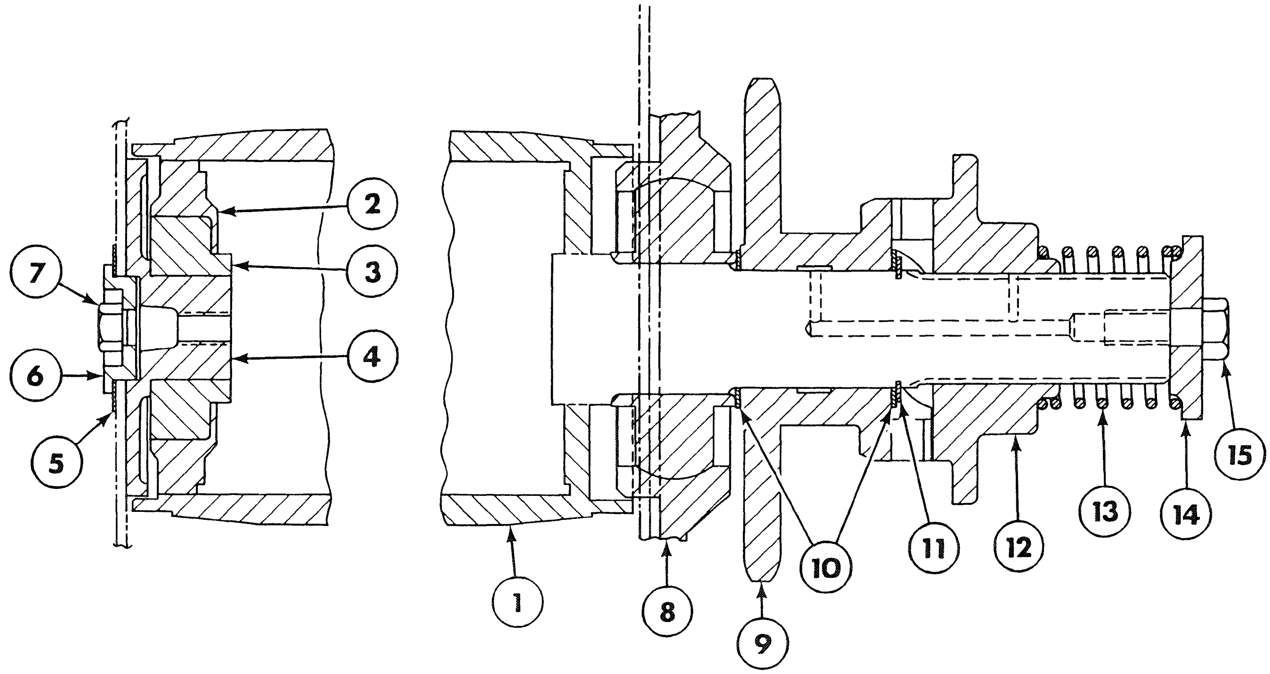


Figure 7-17

Inspection

Inspect the roll shafts for damage or wear which would affect bearing life. Check the rubber covering for gouges or cuts which could affect belt tracking. Replace the roll if required.

Figure 7-17 shows the component breakdown of the drive roll assembly for Models 654 and 664.

1 - Drive roll assembly
2 - Bearing housing
3 - Bearing
4 - Support assembly
5 - Washer
6 - End cap hub
7 - Cap screw M12 x 45
8 - Bearing and housing
9 - Clutch and sprocket weld assembly.
10 - Washer
11 - Retaining ring
12 - Outer clutch half
13 - Spring
14 - End cap
15 - Drilled cap screw

Installation

Install the roll in reverse order of disassembly. Apply antiseize to the bearing and surface.

On the right-hand end of the roll, assemble the washer end cap hub and the M12 cap screw, as shown at 1. Apply 242 Loctite® or equivalent and torque the cap screw to 74 ft. lbs. - 80 ft. lbs. (100 N·m -108 N·m).

On the left side, check the bearing and housing to insure that the lube hole in the bearing aligns with the housing. Install the bearing/housing assembly and torque the M10 cap screws to 41 ft. lbs. (56 N·m).

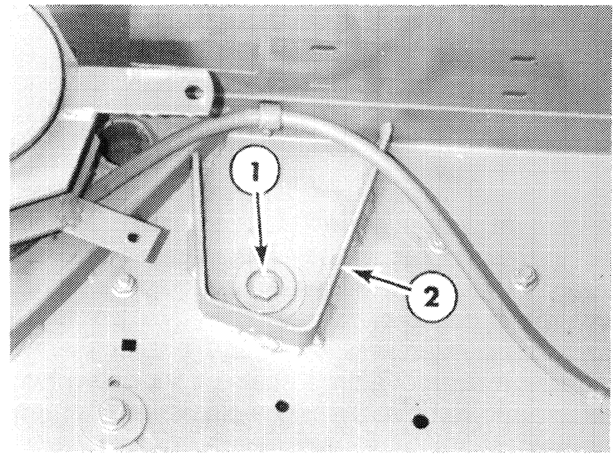


Figure 7-18

2370-12

Complete the assembly of the clutch, applying antiseize grease to the splined shaft. Install drilled cap screw, 15, using Loctite 242. Torque to 74 ft. lbs. - 80 ft. lbs. (100 N·m - 108 N·m).

Replace the drive chain, clutch fork, and lube line as shown. Adjust the drive chain to tension the idler spring as shown. Replace any shielding removed and retension the belts.

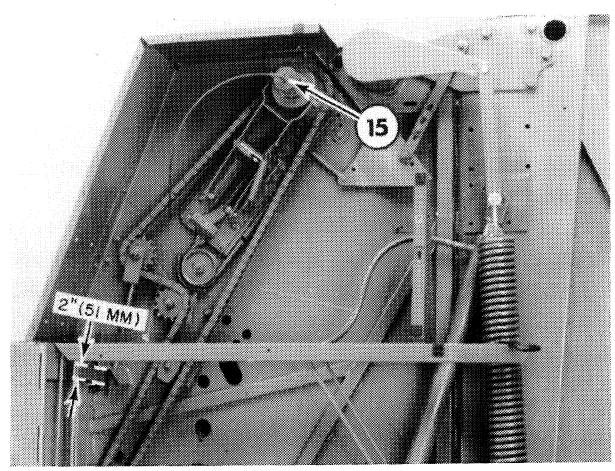


Figure 7-19

2364-4

APRON DRIVE ROLL DECLUTCH

The apron declutch used on the Models 654 and 664 is used to stop the belts when the tailgate is opened during bale ejection.

Clutch Disassembly

Remove the grease line at 1. Remove drilled cap screw, 2; end cap, 3; spring, 4, and outer clutch half, 5.

Loosen and remove drive chain, 6. Remove pivot bolt, 7, and remove the fork weld assembly from the baler.

Remove the retaining ring and washer from the drive roll shaft. Remove the clutch and sprocket weld assembly, 8.

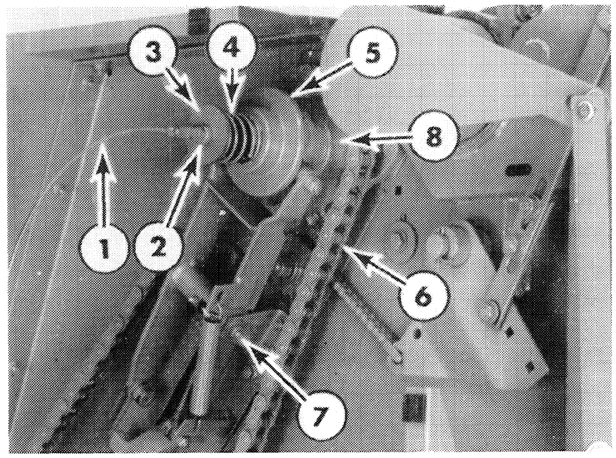


Figure 7-20

2382-6

To remove cam block, 9, disconnect the spring at 10, and remove the connector links at 11.

Remove the nuts at 12, and separate the retainer flat and spring brackets. Remove the cam block.

Inspection

Examine the fit-up of the mating clutch halves. If they appear to be rounded, indicating frequent slippage, the parts should be replaced.

Check the follower bearings in the fork weld assembly. Replace any bearing which feels rough when rotated or seal damage is evident. Inspect the cam block for excessive wear on the surface contacted by the follower bearings. Replacement is required only if the fork weld assembly pivot cannot be reshimmed to allow for the excessive wear.

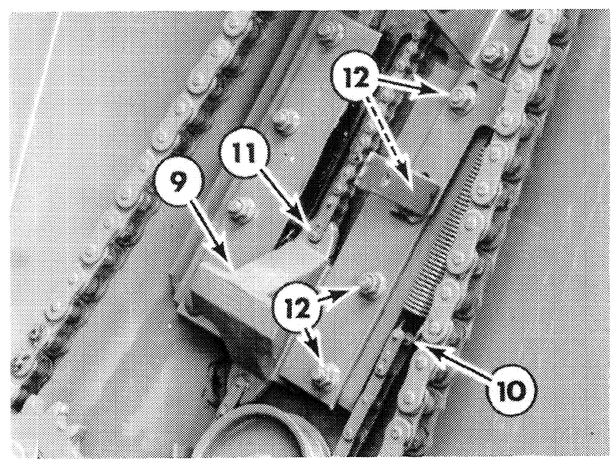


Figure 7-21

2545-11

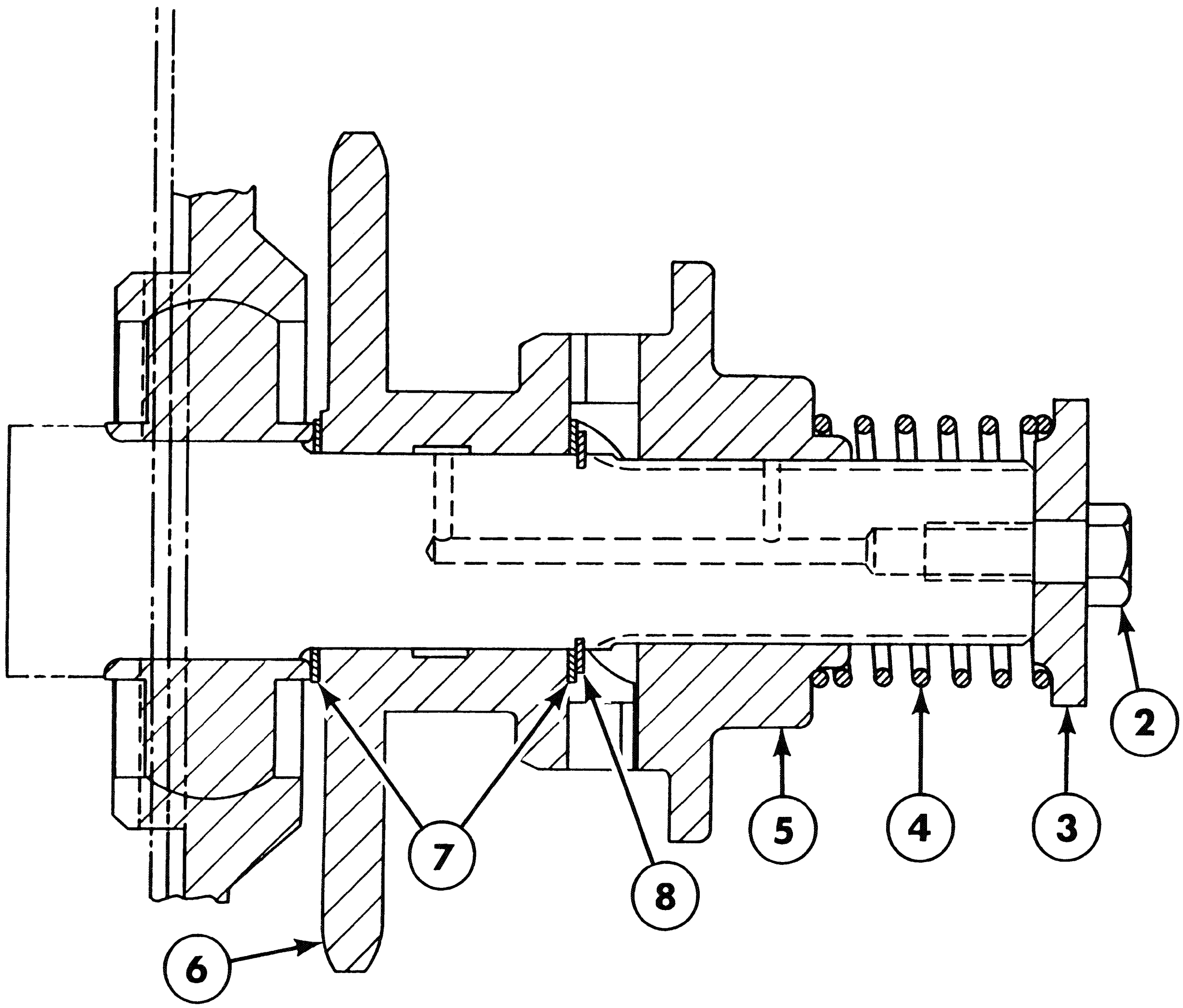


Figure 7-22

Installation

Replace the clutch in reverse order of disassembly, applying lithium grease to the splined shaft.

Install drilled cap screw, 2, using Loctite #242. Figure 7-22 shows the components of the two mating clutch halves.

2 - Drilled cap screw
3 - End cap
4 - Spring
5 - Outer clutch half
6 - Clutch and sprocket weld assembly
7 - Shim washer
8 - Retaining ring

When replacing the cam block, coat all mating surfaces with lithium grease.

Replace the drive chain and adjust the tension spring to 2″ (51 mm), as shown in Figure 7-20. Reinstall lubrication line, 1, Figure 7-21.

With straps, 2, positioned as shown, the belts will stop when the tailgate is opened approximately 36″ (90 cm) and not restart until the tailgate is lowered to the same position. Adjust straps, 2, to obtain a distance of 2″ ± 1/8″ (50 ± 3 mm) between cam block, 9, and fork follower rollers, 13. If the belts start when the tailgate is at full height, readjust the straps. Observe the distance the clutch halves separate when the tailgate is raised. If the clutch halves do not completely separate, add a shim to each pivot mount at 14. If the clutch does not disengage and fork roller bearing, 13, comes over the top of the cam block, remove a shim from each pivot.

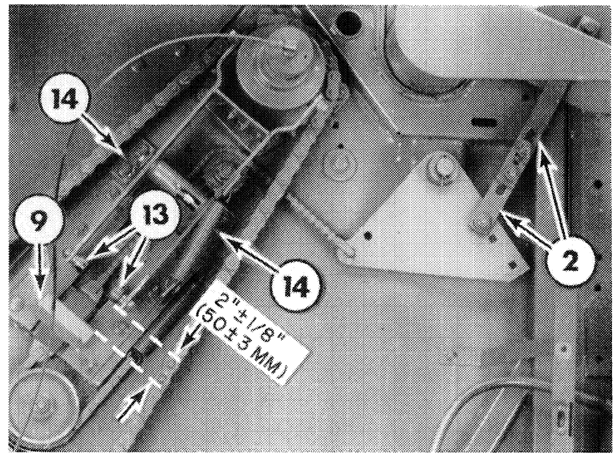


Figure 7-23

2382-7

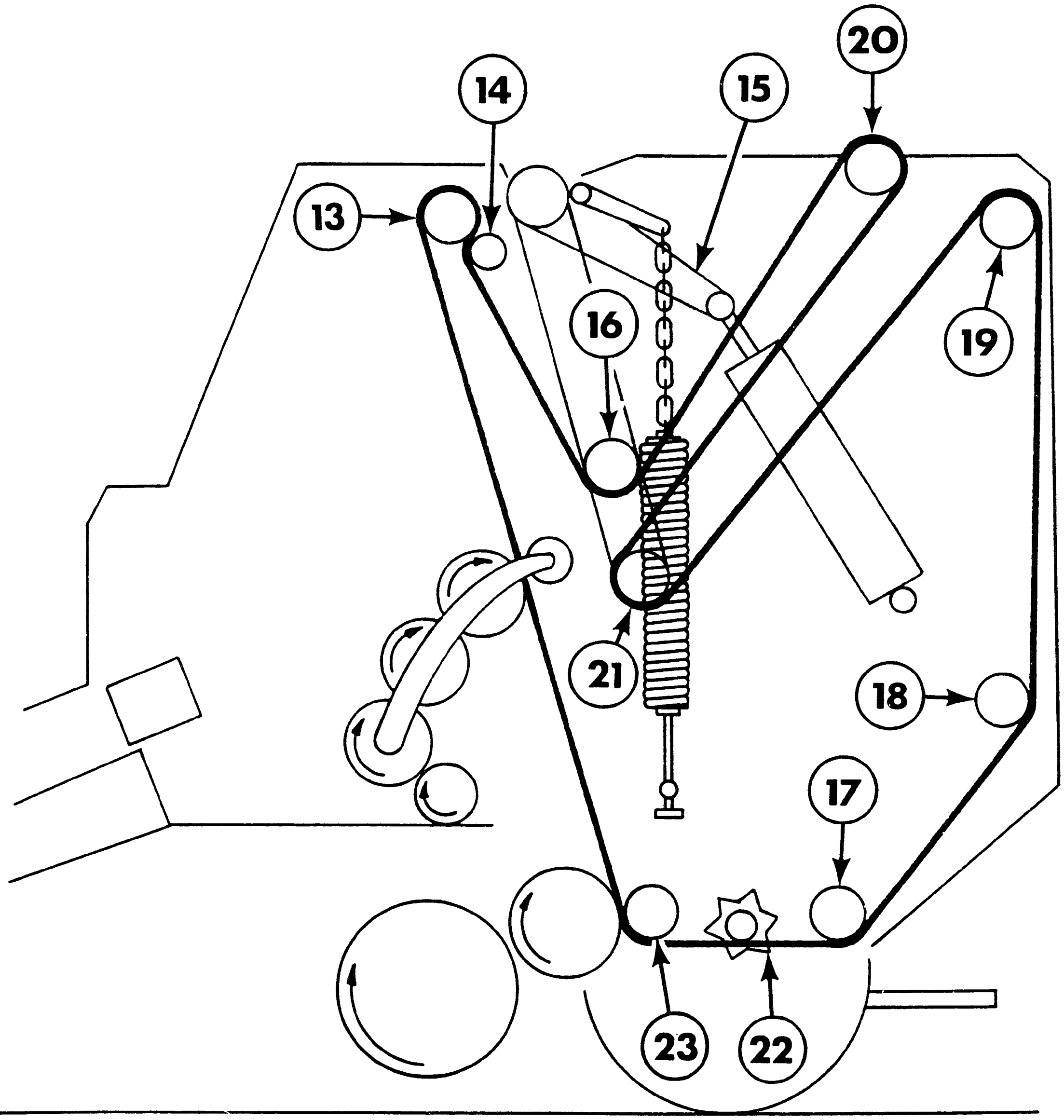


Figure 7-24

IDLER ROLLS

The idler rolls, 14, 16, 17, 18, 19, 20, 21, 22, and 23, are similar on all models. The roll diameter varies depending on location and load applied.

Before attempting to remove any roll, release the belt tension as described at the beginning of this section. See Figures 7-2 through 7-5.

The removal of any of the previous rolls is easier if the belts are removed but is not mandatory. All rolls, except 16 and 21 on the serpentine arm, are accessible from each side of the baler. See Figures 7-25, 7-26, or 7-27.

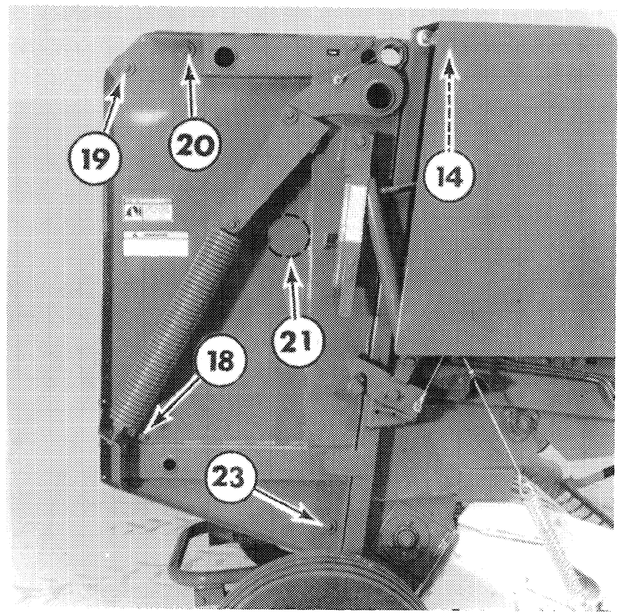


Figure 7-25

A3966-10

Model 634

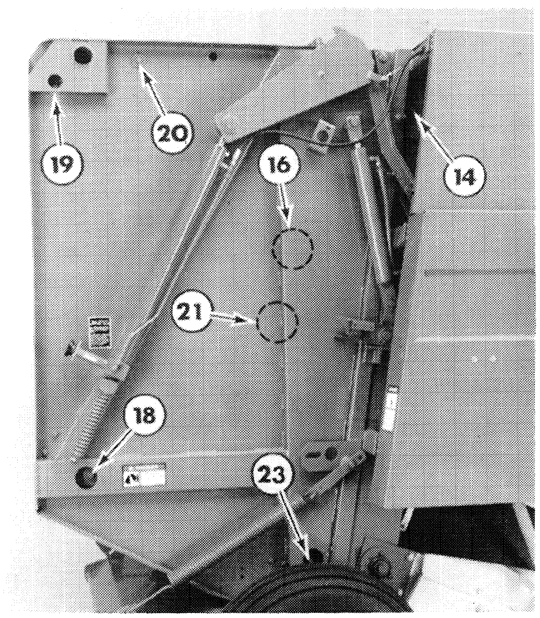


Figure 7-26

1490-10

Model 644

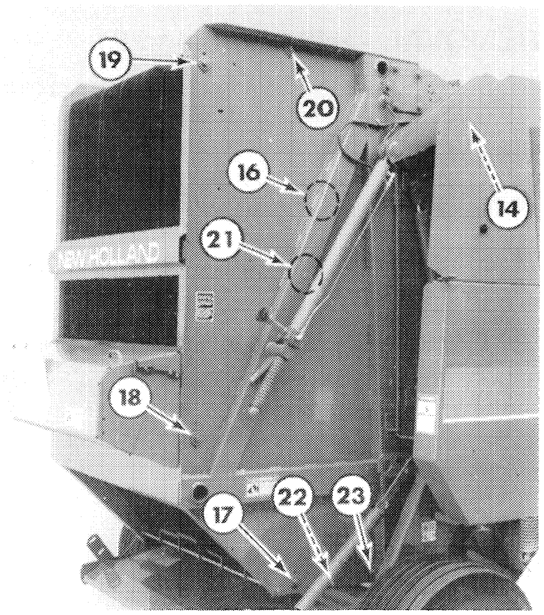


Figure 7-27

2361-5

Models 654-664

REMOVAL - ROLLS 14, 17, 18, 19, 20, 22, and 23

To remove, use the appropriate size wrench with a punch inserted through the frame to prevent the support hub from rotating.

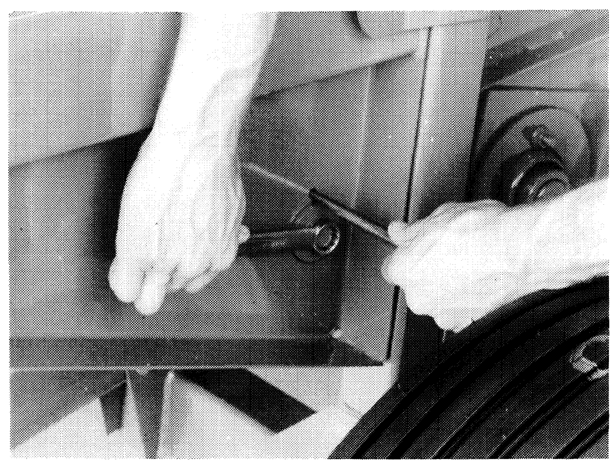


Figure 7-28

8312-8

REMOVAL - ROLLS 16 and 21

To gain access to the retaining cap screws:

Model 634

Take-Up Arm Roll Removal

1. Remove spring anchor bolts, 1, on each side of the machine.
2. Remove the lacing wire from all of the belts.

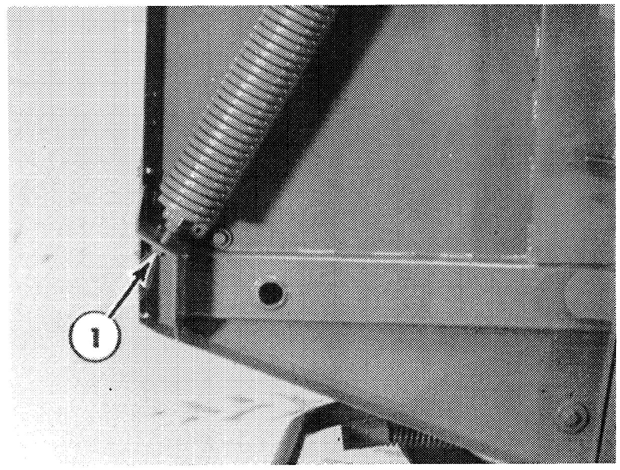


Figure 7-29

A3966-10

3. Raise the tailgate and pull the take-up arms down as shown.
4. Remove cap screw, 1, on each side of the take-up arms. The take-up roll, 21, can now be removed.

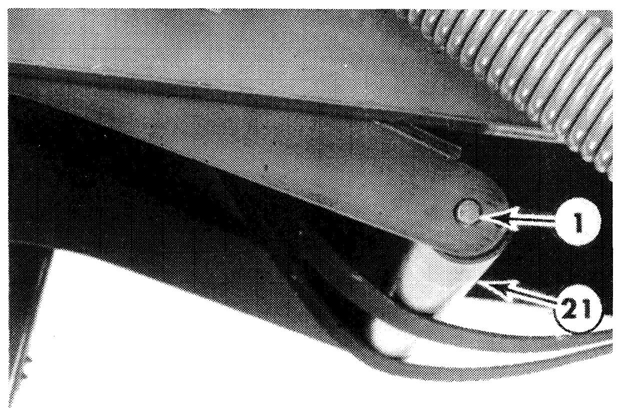


Figure 7-30

Model 644

Removal - Rolls 16 and/or 21

1. Loosen and remove the spring tension bolt at 2, Figure 7-31.

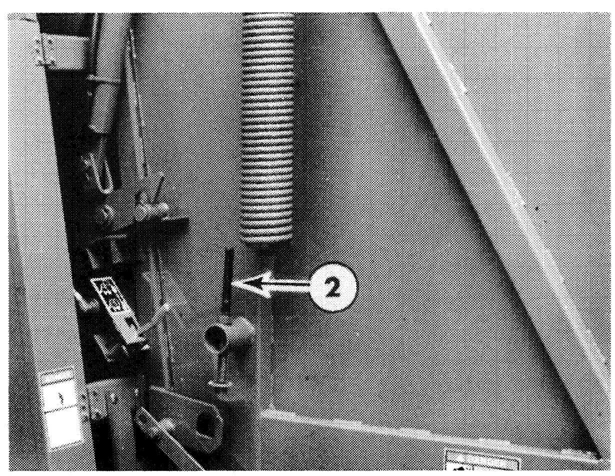


Figure 7-31

2. Loosen the lock, 1, and turn the valve handle counterclockwise to decrease all pressure.

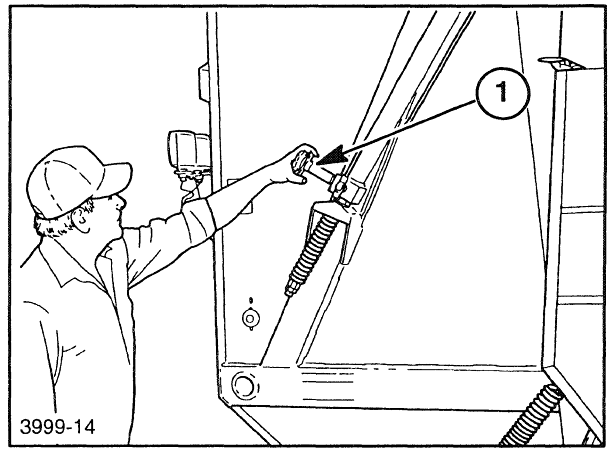


Figure 7-32

3. Using an overhead hoist or forklift, attach a lifting strap to either roll 16 or 21. Lift the roll upward until the roll cap screws at 1 are visible.
4. Remove the cap screws from each end of the roll and remove from the top.

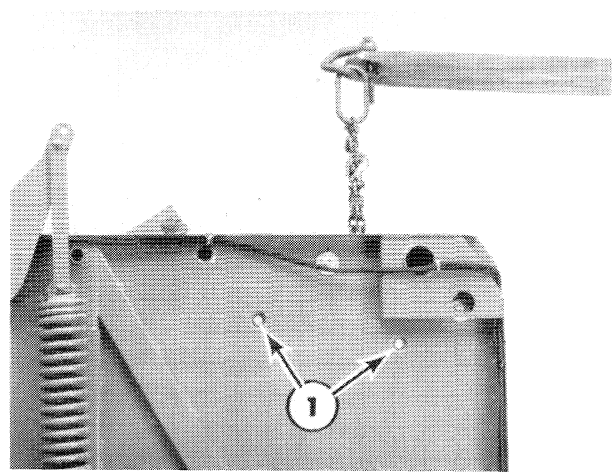


Figure 7-33

Models 654 and 664

Laced Belts

1. Raise the tailgate and lock the tension arm, Figure 7-5, and lower the tailgate.
2. Remove the apron belts from the baler.

   NOTE: The belt may be left in the baler if roll, 19, Figure 7-27, is removed to allow sufficient belt slack.

3. Use a strap or chain, as shown in Figure 7-34, to lift the take-up and release retaining pin, 1, Figure 7-5. Lower the arm and remove the retainer.
4. Raise the tailgate and secure the safety lockout. Rolls 16 and 21 can now be removed. See Figure 7-35.

   NOTE: Optional scrapers are shown.

Models 654 and 664

Endless Belts

The same procedure for removing rolls 16 and 21, Figure 7-24, on laced belts applies to endless belt models also. Instead of removing the belts in step 2, remove roll, 19, Figure 7-27. This will allow sufficient belt slack to pivot the take-up arm assembly down, allowing access to roll hardware.

Inspection

Check all roll bearings for indications of roughness when rotated and seal deterioration. Replace any bearing which appears questionable.

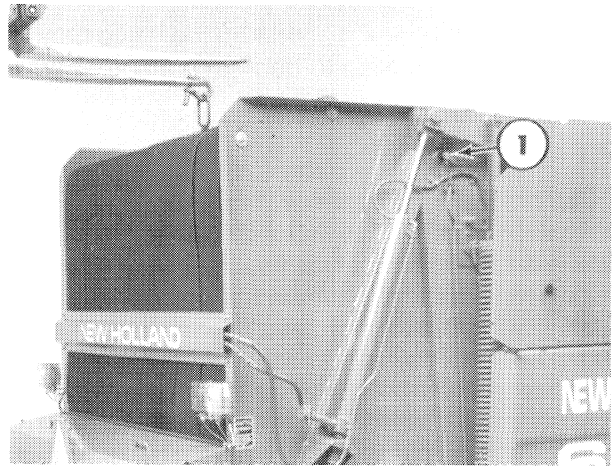


Figure 7-34

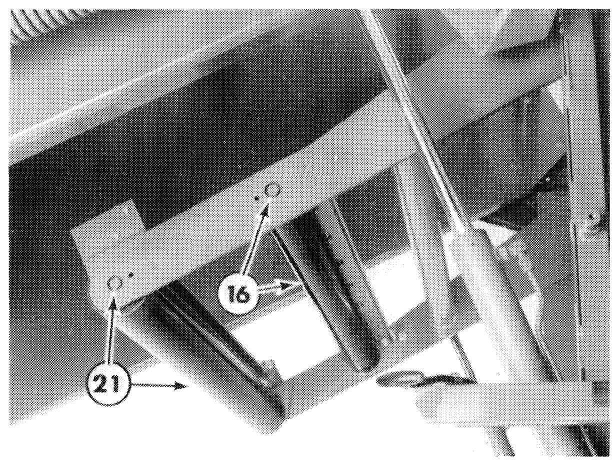


Figure 7-35

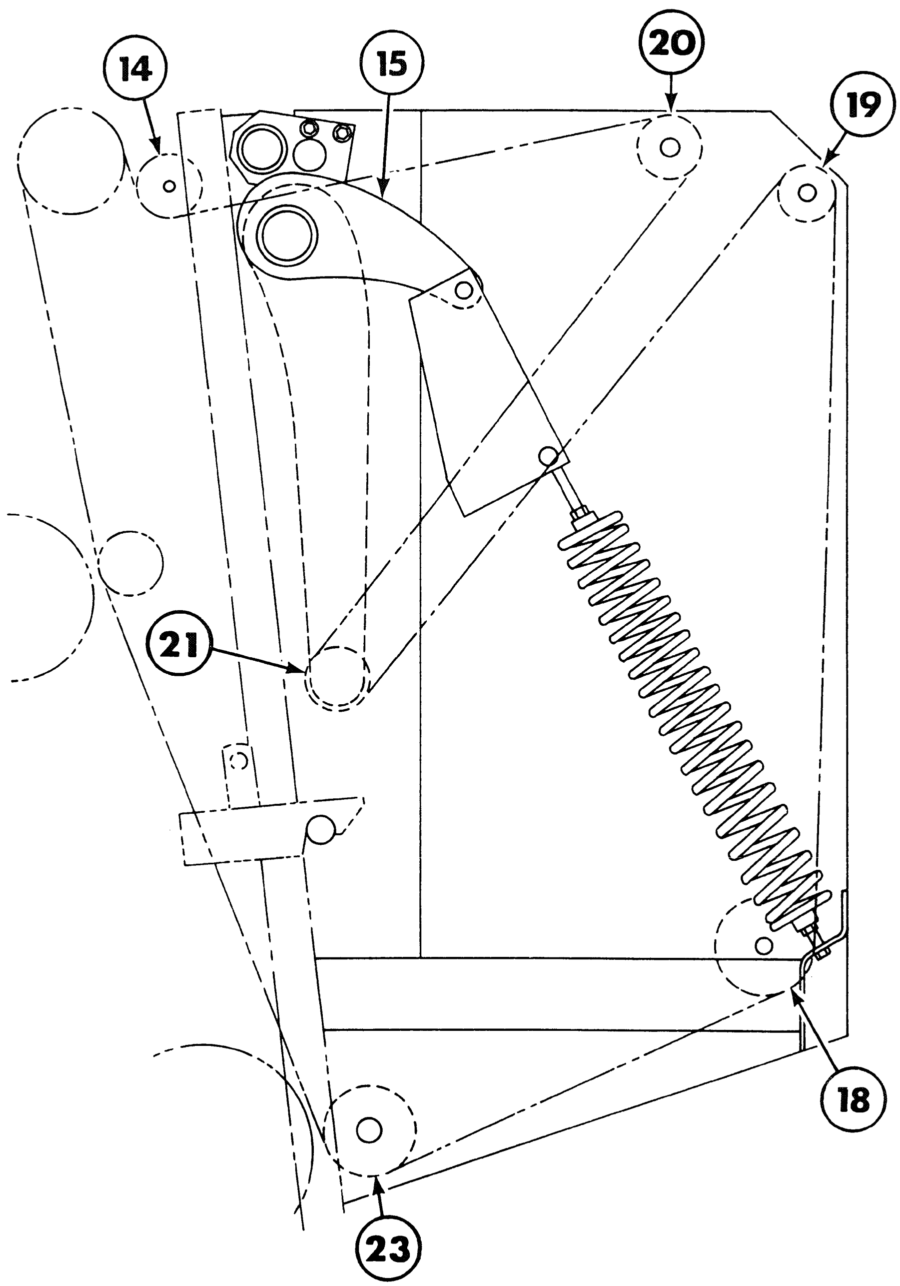


Figure 7-36

Assembly

Roll replacement is accomplished by reversing the disassembly procedure. Figures 7-36, 7-37, and 7-38 show the roll location for each model baler.

Model 634

14 - Back wrap roll
15 - Take-up arm
18 - Tailgate idler rolls
19 - Tailgate idler rolls
20 - Tailgate idler rolls
21 - Rear take-up arm roll
23 - Tailgate nose roll

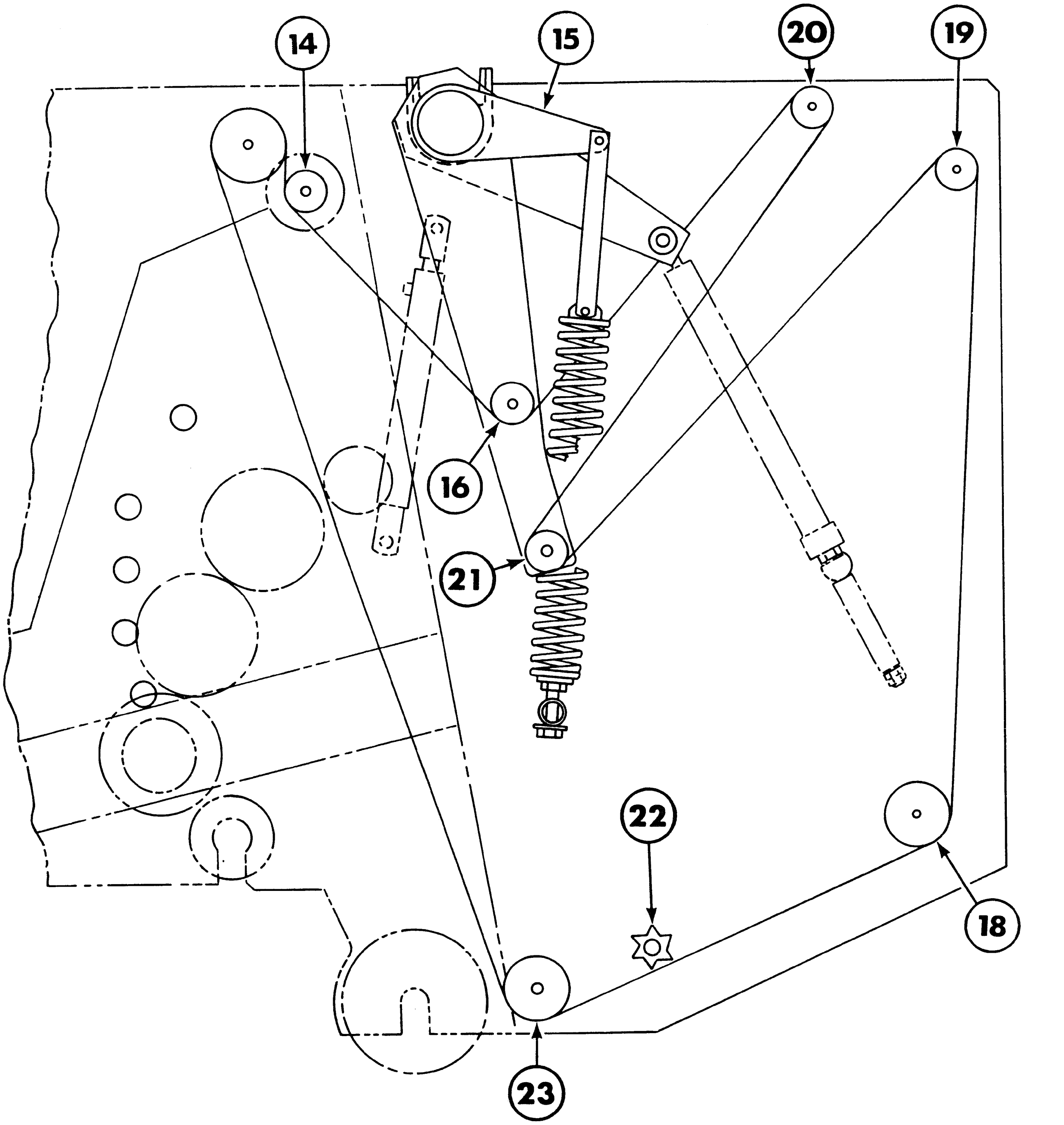


Figure 7-37

Model 644

14 - Back wrap roll
15 - Take-up arm
16 - Front take-up arm roll
18 - Tailgate idler rolls
19 - Tailgate idler rolls
20 - Tailgate idler rolls
21 - Rear take-up arm roll
22 - Optional expeller roll
23 - Tailgate nose roll

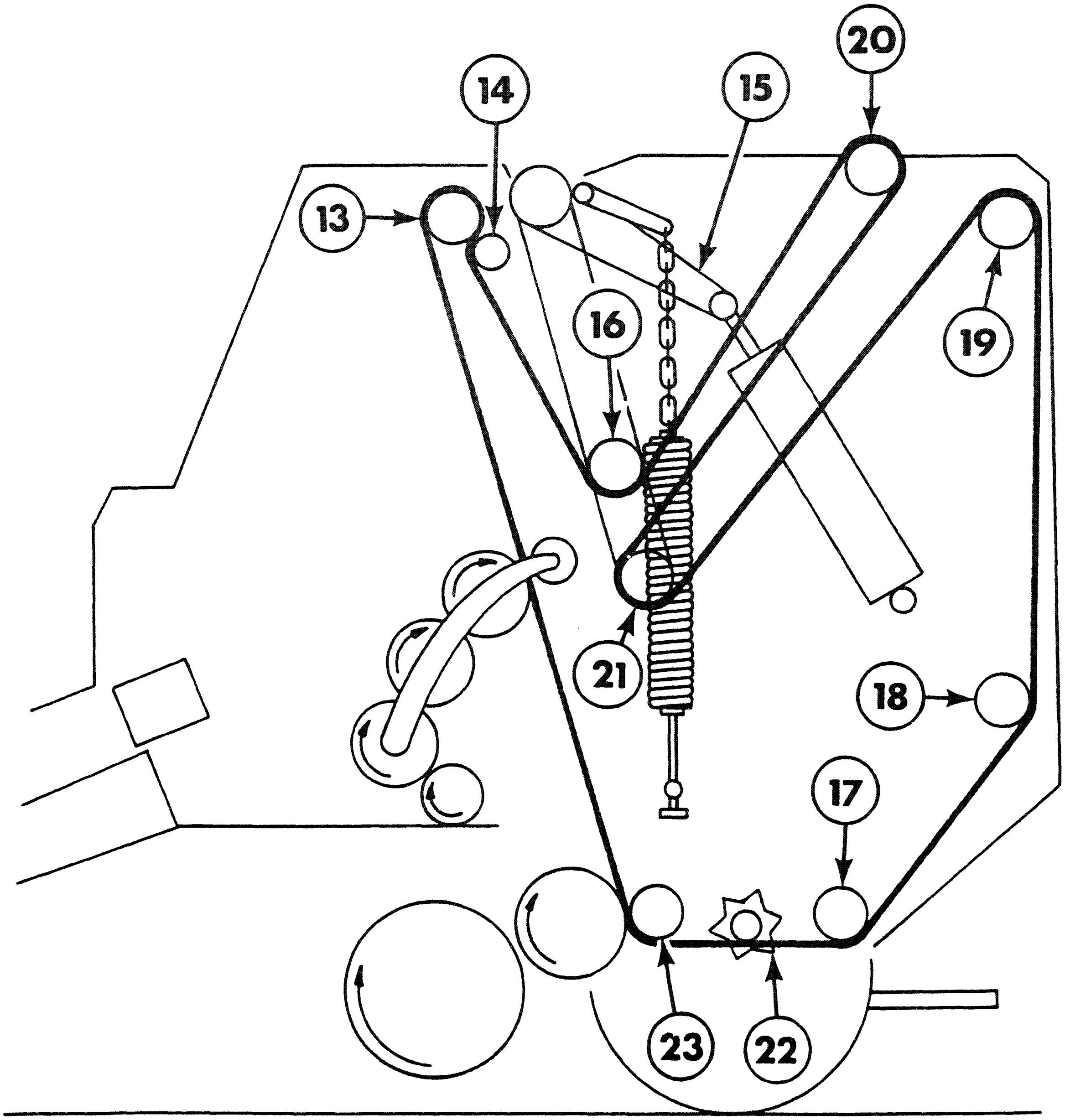


Figure 7-38

Models 654 and 664

14 - Back wrap roll
15 - Take-up arm
16 - Front take-up arm roll
17 - Tailgate idler rolls
18 - Tailgate idler rolls
19 - Tailgate idler rolls
20 - Tailgate idler rolls
21 - Rear take-up arm roll
22 - Optional expeller
23 - Tailgate nose roll

All idler rolls are assembled in a similar manner. See Figures 7-39 to 7-45 for specific roll and bearing assembly.

Figure 7-39 shows the configuration of rolls:

Model 634 - 14, 19, 20
Model 644 - 14, 19, 20
Models 654 and 664 - 14, 17

1 - Cap screw
2 - Washers
3 - Side sheet
4 - Support assembly
5 - Bearing
6 - Roll
7 - Shaft with roll pin

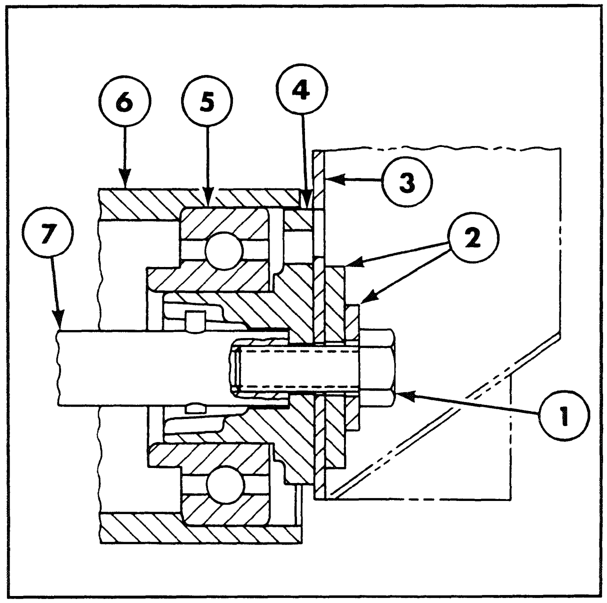


Figure 7-39

Figure 7-40 shows the configuration of rolls:

Model 634 - 21
Model 644 - 16, 21, 22
Models 654 and 664 - Optional roll 22

1 - Cap screw (M12 x 30)
2 - Washers (optional expeller roll location only)
3 - Take-up arm or side sheet in
(expeller location)
4 - Support assembly
5 - Bearing
6 - Roll
7 - Shaft with roll pin

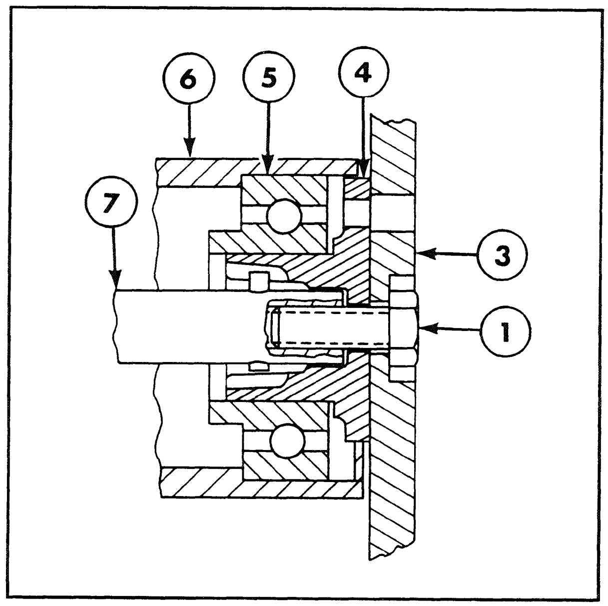


Figure 7-40

Figure 7-41 shows the configuration of roll 16 on Model 654 and Model 664.

1 - Cap screw (M12 x 30)
3 - Take-up arm
4 - Support
5 - Bearing
6 - Roll

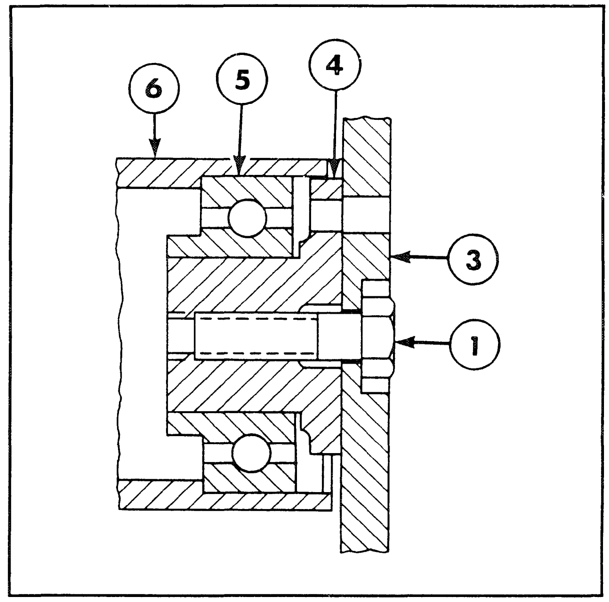


Figure 7-41

Figure 7-42 shows the configuration of rolls:

Model 634 - 18, 23
Model 644 - 18
Models 654 and 664 - 19, - 20

1 - Cap screw (M12 x 30)
2 - Washers
3 - Side sheet
4 - Support assembly
5 - Bearing
6 - Roll
7 - Shaft with roll pin
8 - Bearing housing

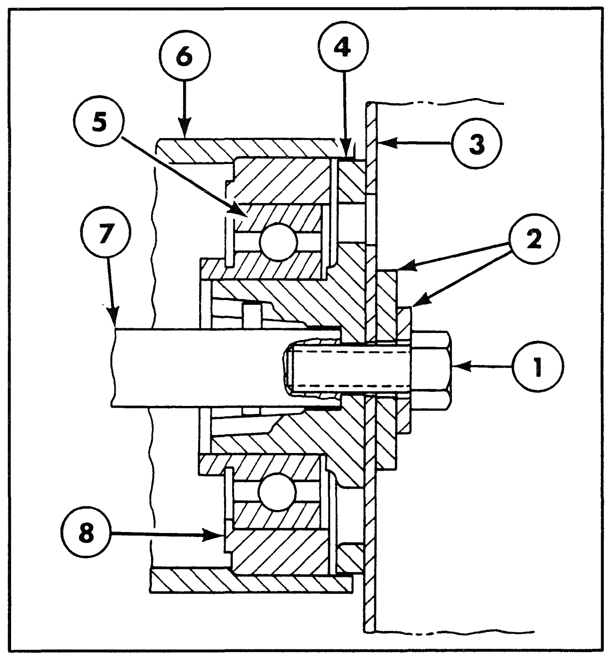


Figure 7-42

Figure 7-43 shows the configuration of rolls:

Model 654 - 18
Model 664 - 18

1 - Cap screw (M12 x 50)
2 - Washers
3 - Side sheet
4 - Support assembly
5 - Bearing
6 - Roll
8 - Bearing housing

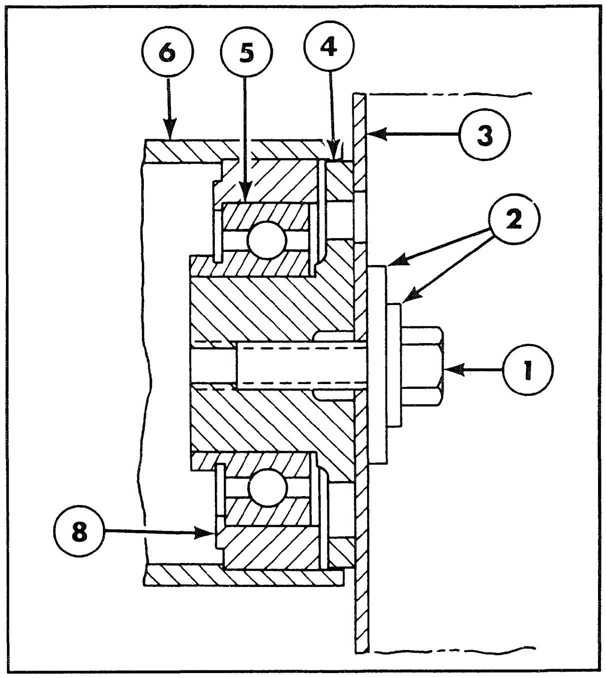


Figure 7-43

Figure 7-44 shows the configuration of roll 21 on Models 654 and 664.

1 - Cap screw (M12 x 30)
3 - Take-up arm weld assembly
4 - Support A
5 - Bearing
6 - Roll
7 - Shaft with roll pin
8 - Bearing housing

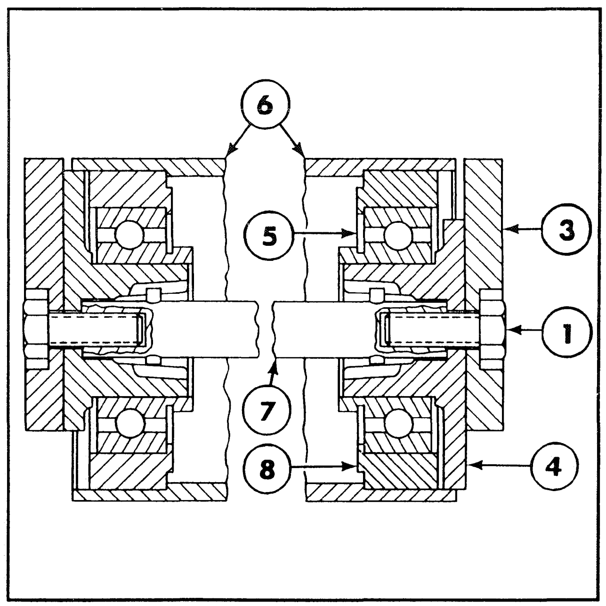


Figure 7-44

Figure 7-45 shows the configuration of roll 23 on Models 644 and Models 654 and 664.

1 - Cap screw (M12 x 50)
2 - Washer
3 - Cap
4 - Support
5 - Bearing
6 - Roll
7 - Shaft with roll pin
8 - Bearing housing

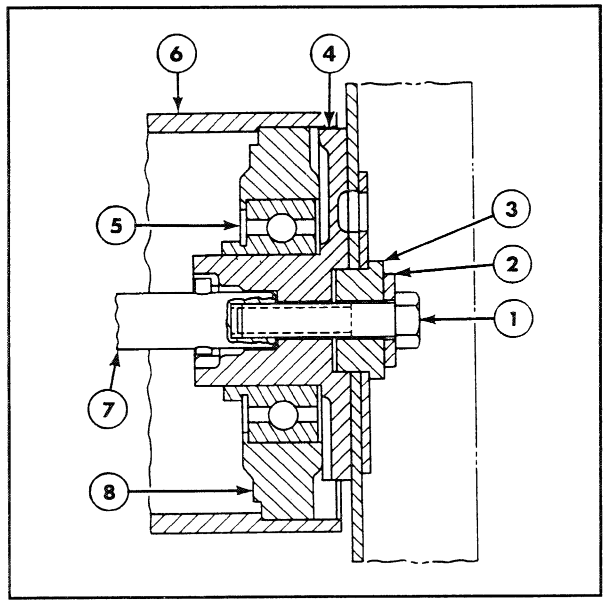


Figure 7-45

NOTE: When replacing the roll assembly, be sure to align the hole in the side sheet or take-up arm with the recessed hole in the support assembly. Torque M12 cap screws to 72 ft. lbs. (97 N·m).

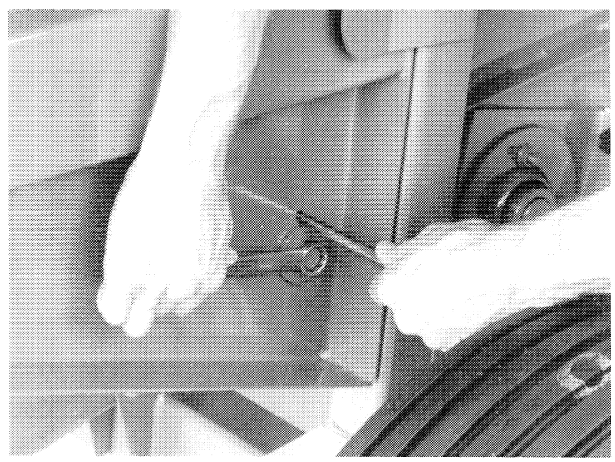


Figure 7-46

Before installing the belts, if one of the take-up arm rolls was removed, it will be necessary to lift the lower take-up arm roll, 21. Replace the lock bolt at 1, or turn the pivot handle. See Figures 7-47 and 7-48.

Replace the belts and release the density system.

See Section 8 regarding any question on belts and installation.

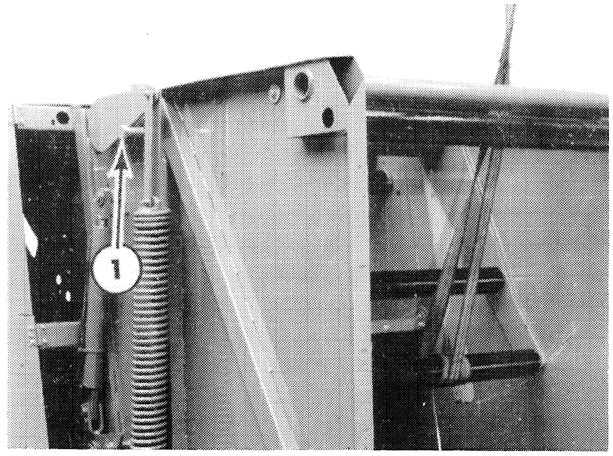


Figure 7-47

2588-5

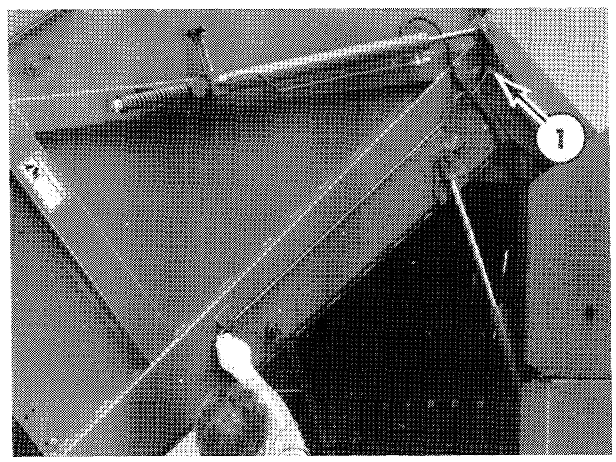


Figure 7-48

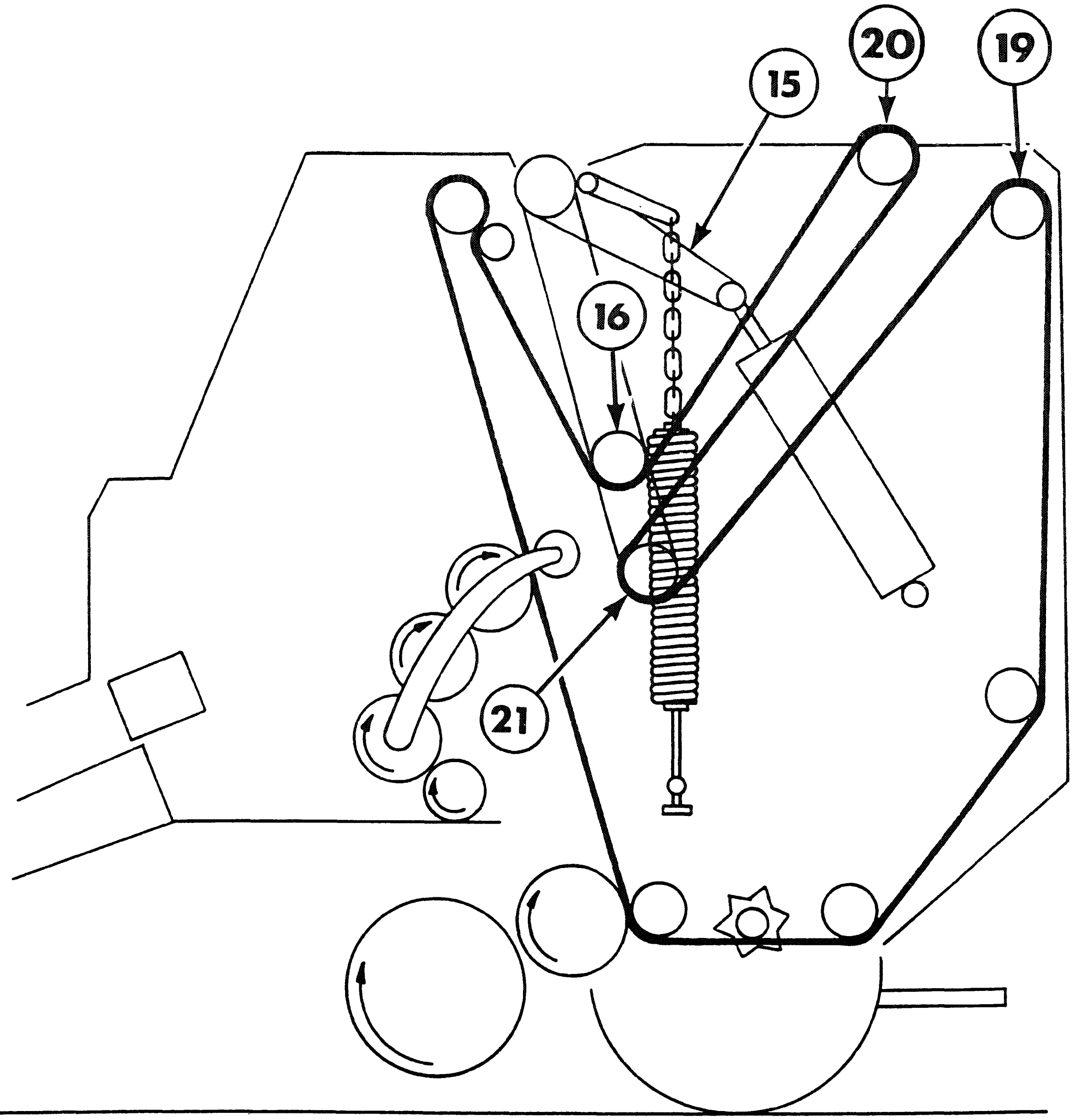


Figure 7-49

Take-Up Arm Assembly

The take-up arms with rolls 16 and 21 are used to maintain the tension on the belts. After the core is established, the resistance of the assembly to rotate up and rearward is what creates tightly-packed bales. The take-up arm assembly has been designed for the life of the baler; however, if the baler is damaged, replacement would be required.

Disassembly

Model 634

1. Open the tailgate and secure the safety lockouts.
2. Remove M10 cap screws on each side of the tailgate at 1.

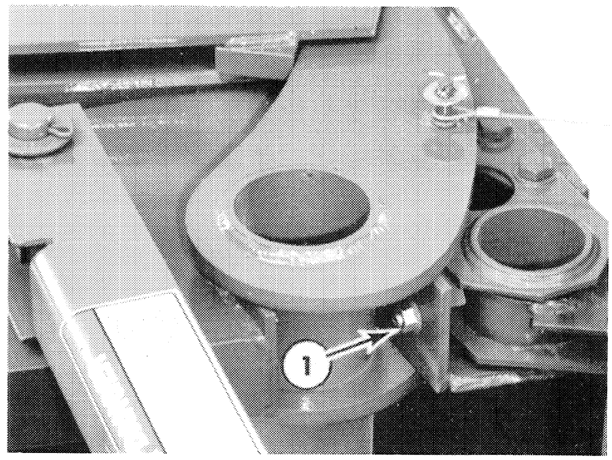


Figure 7-50

3. Lower the tailgate and remove the spring bolt at 2, on each side.

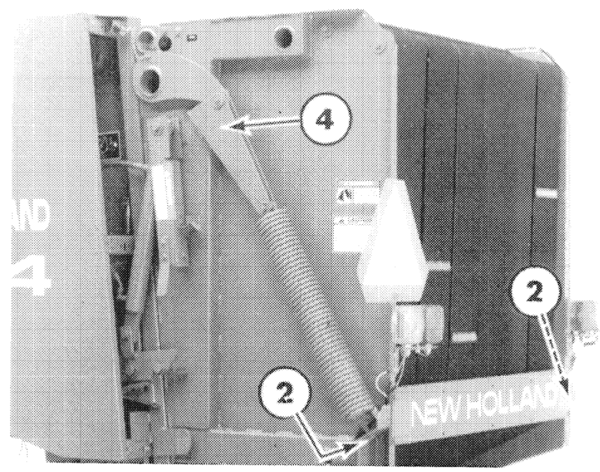


Figure 7-51

A4116-11

4. Raise the tailgate and install bolt, 1, Figure 7-52.
5. Lower the tailgate and remove the apron belts.
6. Remove the tailgate latch indicator cable and the bale counter chain on the opposite side of the baler.
7. Remove the upper clevis pin at 4, Figure 7-51, on each side to remove the spring and plate assemblies.
8. Carefully raise the tailgate until the take-up arm assembly can be removed from the saddle mount.

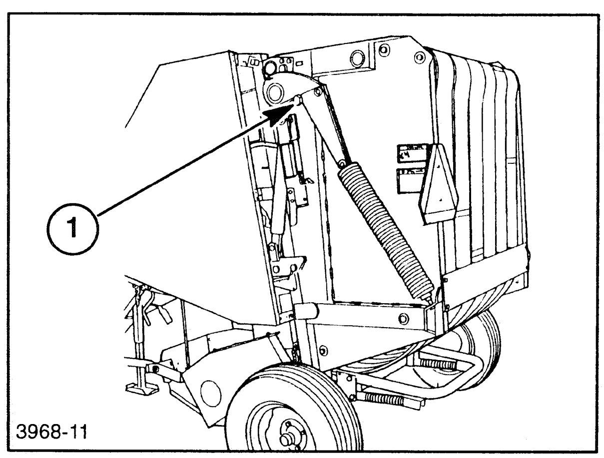


Figure 7-52

Models 644, 654, and 664

NOTE: Some of the photos show the Model 660 with endless belts. All models are similar.

1. Loosen the spring tension bolt(s) until the springs are relaxed with 2″ - 3″ (50 mm - 75 mm) free length at 1, Figure 7-53.
2. Raise the tailgate and secure the take-up arm lock system, as shown in Figures 7-4 and 7-5, depending on model.
3. Lower the tailgate and remove the apron belts.

   On units equipped with endless belts, remove the upper rear tailgate roll, 19 or 20, Figure 7-49, to allow sufficient belt slack.

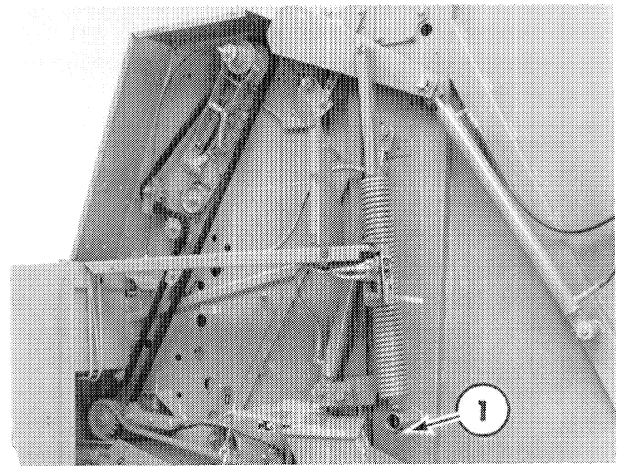


Figure 7-53

A3974-3

4. To release the lock system on the single-density system may require an overhead hoist or forklift to lift the lower take-up arm roll, 21, Figure 7-49.

5. On endless belt models, open the tailgate until the roll hardware is exposed and lock the tailgate. Remove the cap screws on each side to remove rolls 16 and 21 from the baler. See Figure 7-54.

   NOTE: On Model 644 Bale Command units, rolls 16 and 21 will not be exposed. Continue disassembly with the rolls in place.

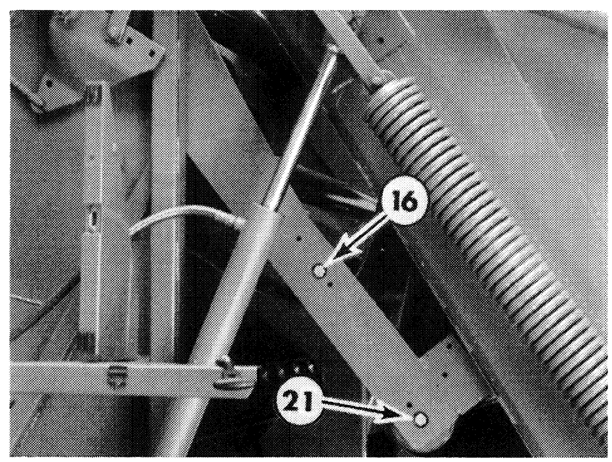


Figure 7-54

2546-4

6. Remove density cylinder pin at 2, on both sides, spring hardware at 3, and all indicator cables or wrapper linkage.

   Remove similar components on other models.

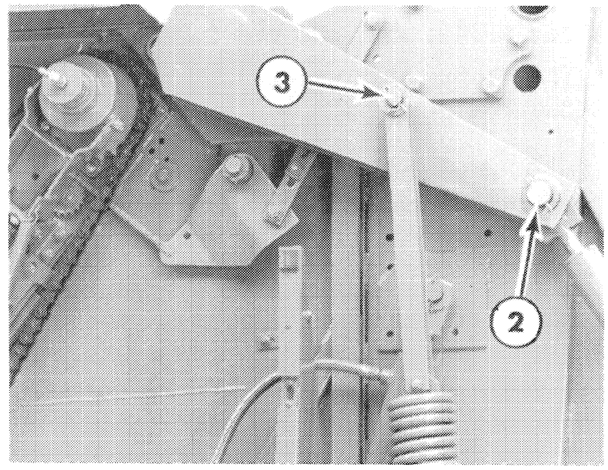


Figure 7-55

A3974-2

7. Remove the bearing cap hardware and cap from each side of the baler.

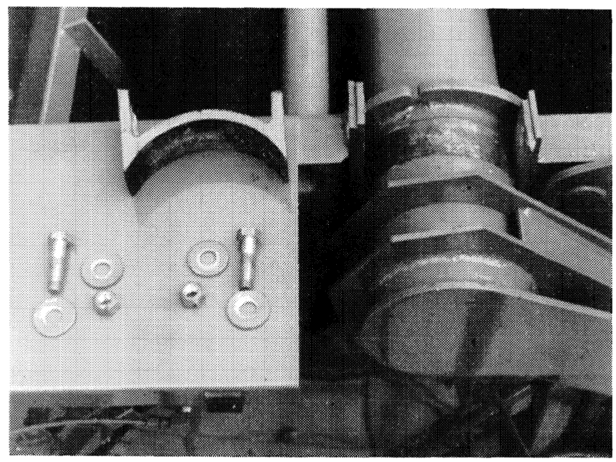


Figure 7-56

2546-3

8. Chain or strap the take-up arm assembly to the lifting device. From inside the baler, rotate the arms up approximately 30″ (762 mm) and secure to overhead. The arm assembly can now be removed from the baler. See Figure 7-57.

   NOTE: The rotation of the arm rearward and upward is required to release the take-up arm from the saddle mount.

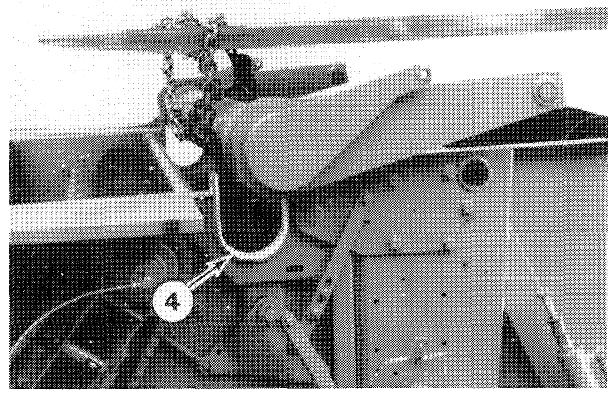


Figure 7-57

2547-1

Inspection

If the take-up arm is damaged, it should be replaced. If rolls 16 and 21 have not previously been removed, inspect all bearings and related components.

Replace nylon bearing, 4, Figure 7-57, any time a take-up arm is removed or when signs of contact of the lower arms with the bale chamber side sheets is observed.

Installation

Reverse the disassembly procedure for installation of the take-up arm components. After the take-up arm assembly is installed, it will be necessary to lift the lower take-up arm roll, 21, to withdraw the density cylinder(s) and lock the lock pin as shown in Figure 7-4 or 7-5.

Replace the belts on the laced baler models and release the density system.

On endless belts, thread roll, 19 or 20, Figure 7-49, through the belts and secure the cap screws. Release the belt tension locking device.

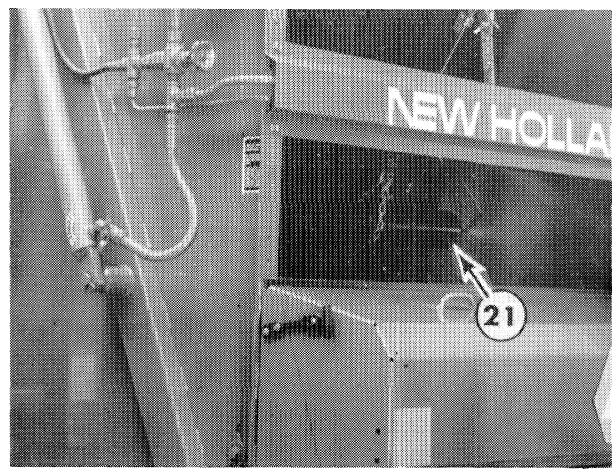


Figure 7-58

2547-7

LABOR GUIDE

	HOURS
DRIVE ROLL REMOVAL AND REPLACEMENT	
634 - 644	2.5
654 - 664	3.0
APRON DRIVE DECLUTCH	
654 - 664 Remove and Rebuild	2.50
IDLER ROLLS	
Remove, Rebuild, and Replace	1.00
TAKE-UP ARM ROLL REMOVAL	
634	2.85
644, 654, 664	3.3
TAKE-UP ARM ASSEMBLY REMOVAL	
634	2.75
644, 654, 664	3.8
Endless Belt Models	3.8

INDEX

SECTION 8

APRON BELTS

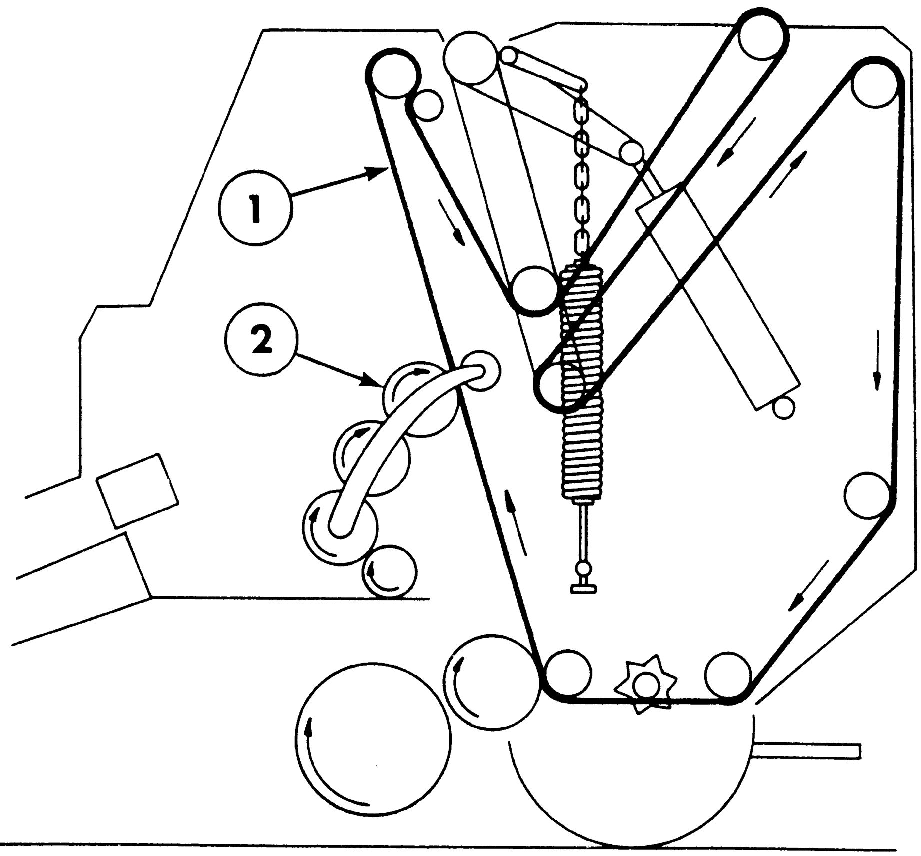


Figure 8-1

This section describes the different maintenance questions related to apron belts, 1.

BELT FAILURE ANALYSIS

Due to the cost of the apron belts on Roll-Belt round balers, it is important to determine whether the belt should be replaced or repaired.

The following are examples of failed belts and what should be done to repair the failure.

This belt was cut by a foreign object in the baler. This failure will not need to be repaired unless the tear extends. If a repair is needed, a repair section of belt can be spliced into this belt. This is not a warranty consideration.

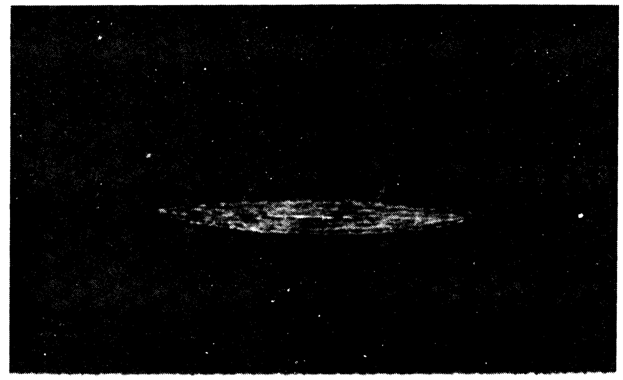


Figure 8-2

This belt is frayed on the side. This is due to normal wear or can also be caused by poor belt tracking. Even with some wear on the belt, there is no reason to replace this belt. Cut off the cords, A, that were pulled to stop further fraying of the belt. Correct any poor belt tracking by following the guidelines for belt tracking in the operator's manual or the tracking section of this manual. This belt would NOT be considered warranty.

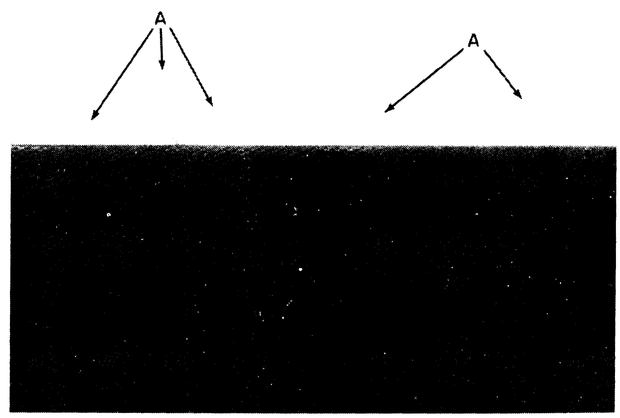


Figure 8-3

These failures are caused by stones. No repair is necessary at this time for either belt. Cut off the loose piece of rubber, A, to stop further tearing of the belt.

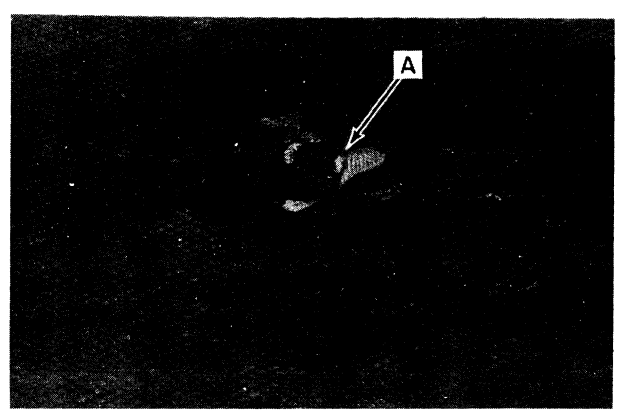


Figure 8-4

The belt does not need to be repaired unless the tear extends.

This belt would not be considered warranty.

Figure 8-5

This belt has a corner missing at the lacing. This was caused by a foreign object or belt tracking. No repair is needed on this belt, as it will not cause a problem with the performance of the baler.

Figure 8-6

This belt has lost a few hooks on the end of the belt. The belt is not torn and can be repaired by adding hooks to each end of the belt and installing a new lacing cable. This is not a warranty consideration.

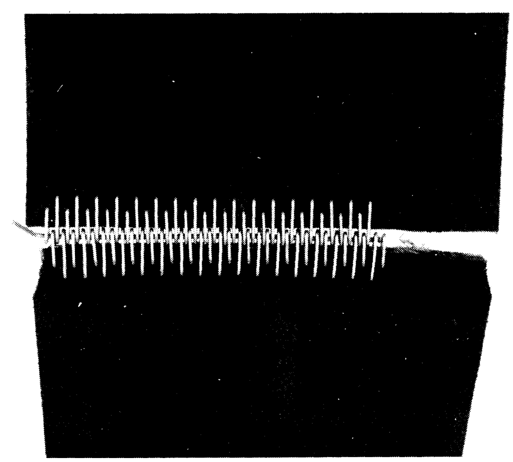


Figure 8-7

This belt has been torn at the lacing. This was caused by either foreign object damage or poor belt tracking. This belt can be repaired by cutting the belt off behind the damaged area and relacing the belt. This belt does not need to be replaced.

This is not a warranty consideration.

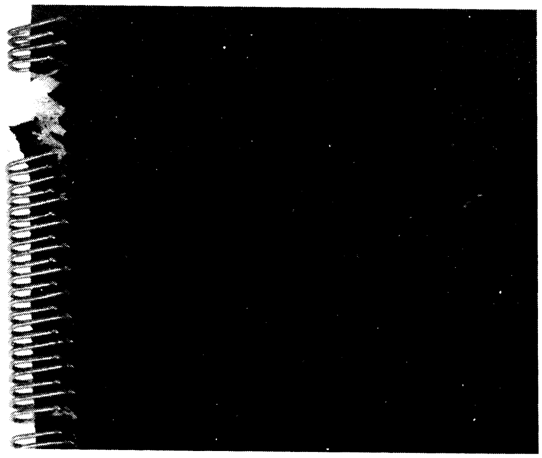


Figure 8-8

These belts are extremely worn and frayed on the sides from poor belt tracking. The plies of the belt have separated. Large pieces of the outer covering were also pulled loose at A. The guidelines in the operator's manual or the tracking portion of this section for belt tracking must be followed or the belts will fail again.

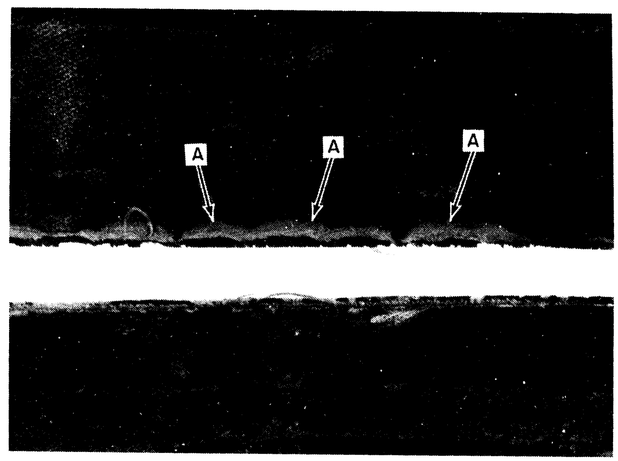


Figure 8-9

These belts show surface damage due to contact with the dimpled stripper roll, 2, Figure 8-1. No repair is needed on this belt, as it will not cause a problem with the performance of the baler.

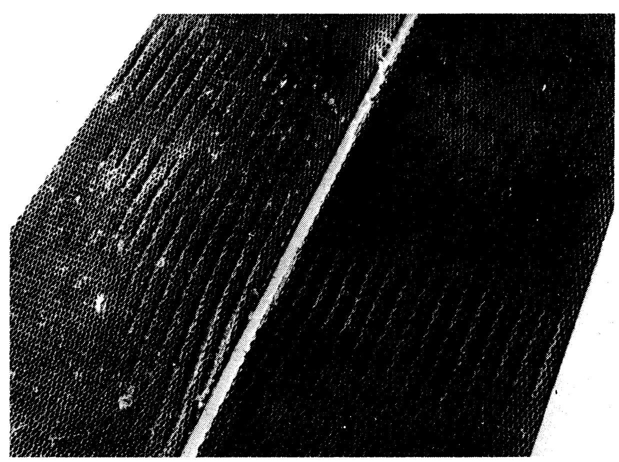


Figure 8-10

A2740-3

This failure is due to poor bonding of the belt. The side of the belt is not marked from poor tracking. If this failure occurs in the first year of use, it would be covered under warranty.

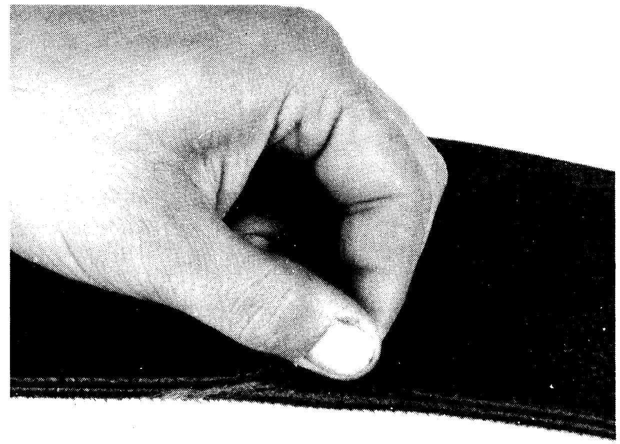


Figure 8-11

ADDITIONAL INFORMATION

If the guidelines in the operator's manual are followed, most belt tracking problems can be eliminated. The feeding of the baler and good bale formation will also affect belt tracking. Too much crop on one side of the bale will cause the belts to track to one side. Changing a belt's location on the baler may also change the way it tracks.

When relacing the belts, the length of the belts should not vary more than one inch. If there is more than one inch difference, all the belts must be cut to the length of the shortest belt. The belts can be shortened until the size of the bale is affected. On a Model 654 or 664 with 420″ (1068 cm) long belts, the belts can be shortened 3″ to 4″ before bale size is noticeably affected. At that time, a minimum of a 24″ section of belt can be added to bring the belt back to the proper length, as stated in the operator's manual.

BELT LACING INSTRUCTIONS

Before performing any maintenance on baler belts, the tension must first be removed.

REMOVING BELT TENSION

Open the tailgate far enough that bolt, 1, Figure 8-12, on the Model 634, or 1, Figure 8-13, on the Model 644, stored on the left side of the frame, can be installed under the spring attaching arm, 1, Figure 8-14.

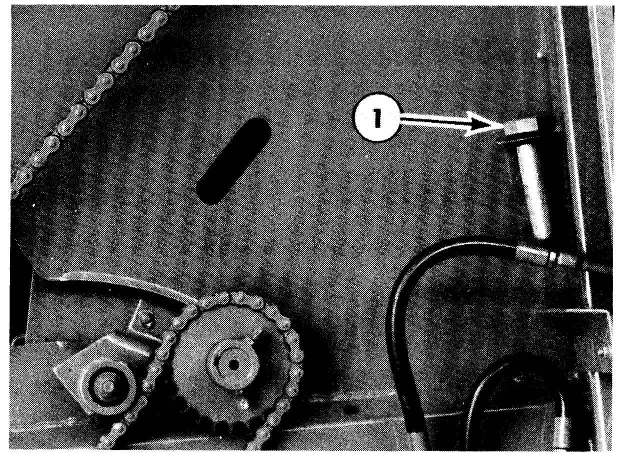


Figure 8-12

A1021-4

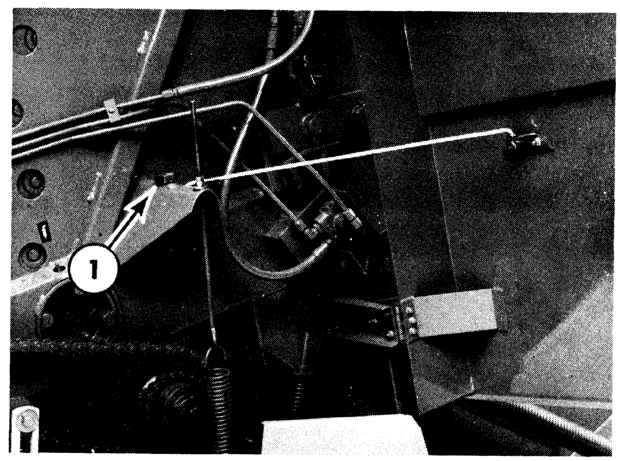


Figure 8-13

A1633-12

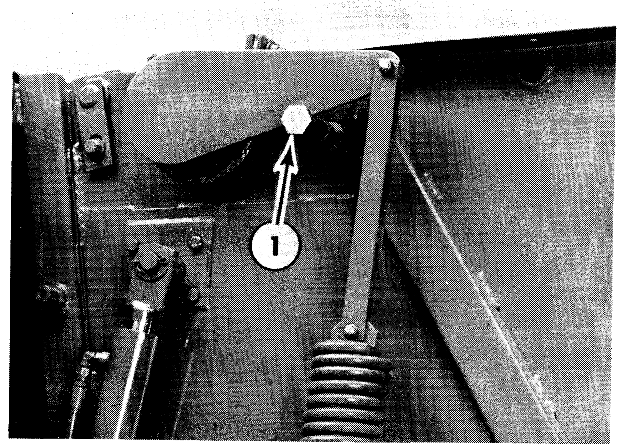


Figure 8-14

A1495-4

Models 654 and 664

To remove belt tension on a Model 654 with single-cylinder density system:

Open the tailgate far enough that lockout pin, 1, can be placed under the take-up arm by moving the handle at 2.

Lower the tailgate. The pin will hold the take-up arm up to remove tension from the belts.

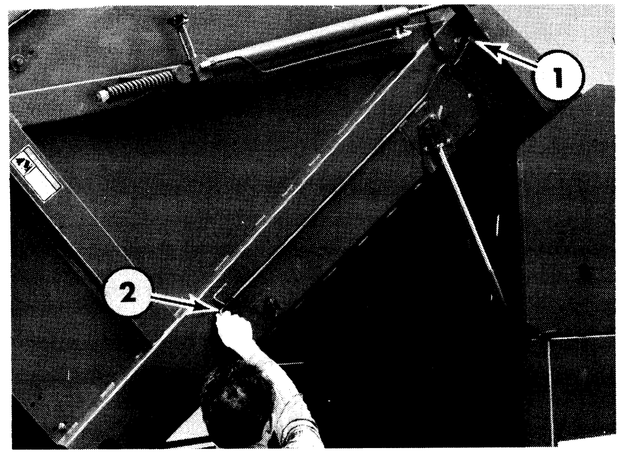


Figure 8-15

A2361-11

CAUTION: IF THE TAILGATE IS NOT LOWERED COMPLETELY, PLACE TAILGATE LOCKOUT VALVE, 1, IN THE UPPER, LOCKED POSITION.

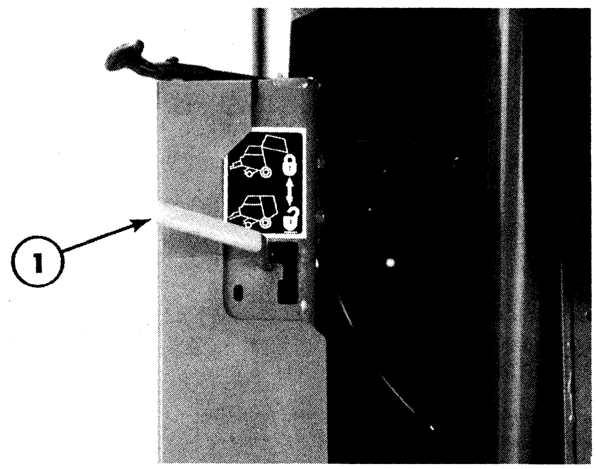


Figure 8-16

A3974-9

Laced Belt Removal

After loosening belt tension, cut the locking ferrule off one end and pull the cable out as shown in Figure 8-17.

Unthread the belts from the machine. When removing more than one belt, mark the belts so they can be reinstalled in the same location.

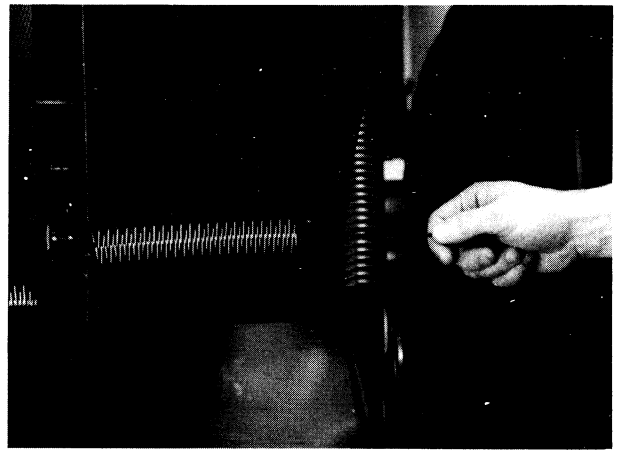


Figure 8-17

A2347-7

Repairing Belt Lacing

Damaged belt lacing clips or a damaged section of belt can be repaired with the proper equipment. Figure 8-18 shows a portable lacer recommended for field and shop use. The vise-mounted lacing tool, shown in Figure 8-19, is NOT recommended for use with the belting and lacing hooks used in the Roll-Belt balers.

The following lacing equipment is available from the Parts Department and Direct-Ship Program.

Portable Lacer - 1	Figure 8-18	WC1701197 DS
Skiver - 2	Figure 8-18	WC1701092 DS
Shear	Figure 8-20	WC1701195 DS
Lacing Hooks - 3 (box of 18 cards)	Figure 8-18	9847138
Lacing Cable Kit		9848161
Crimping Pliers	Figure 8-32	OTC Company 00250

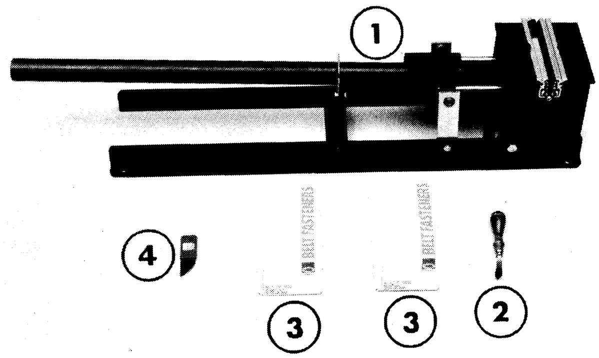


Figure 8-18

A1765-11

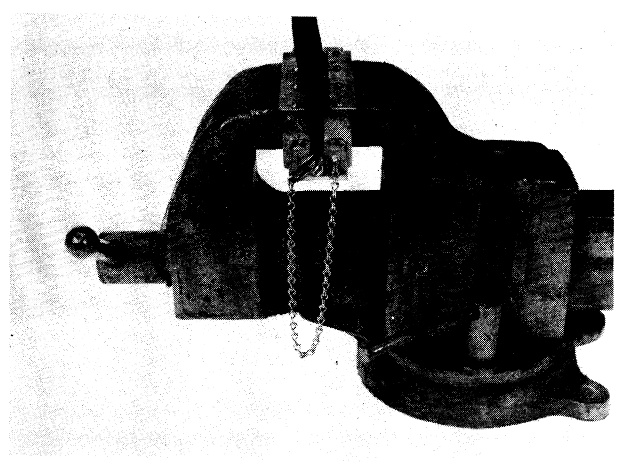


Figure 8-19

If repairing more than one belt, determine which belt, after removing the damaged area, is shorter. If this belt is 1″ or more shorter than the remaining belts, shorten all belts to the same length.

Using the shear shown in Figure 8-20, cut off the damaged section.

NOTE: Be sure to align the belt against the guide to insure a square cut. An unsquare cut will cause unsquare hook placement which, in turn, causes poor belt tracking.

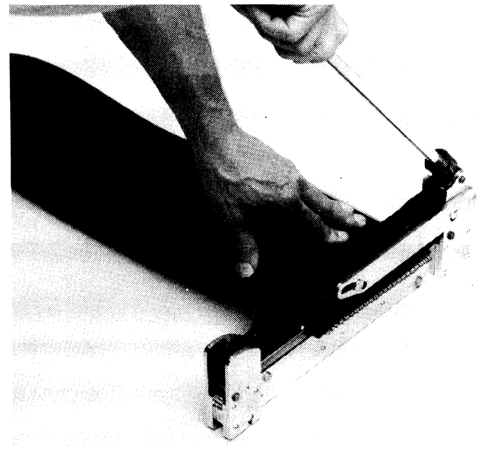


Figure 8-20

A2005-8

Using the belt skiver, trim off the rough top to a depth of 0.2″ (5 mm). Extend the skiving back to 1″ (25 mm).

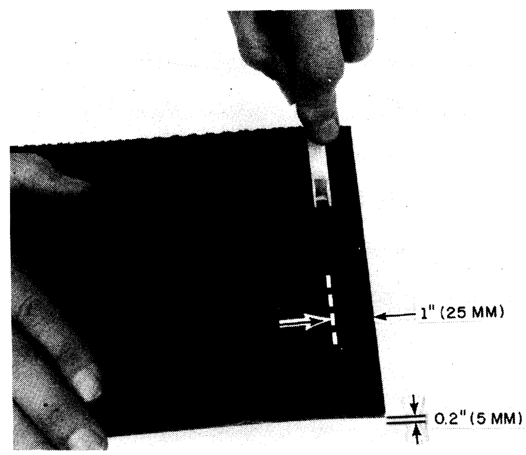


Figure 8-21

A2004-9

Lift the lever up overcenter to open the lacer jaws. Insert a lacing card into the slot openings. Insert the lacer pin.

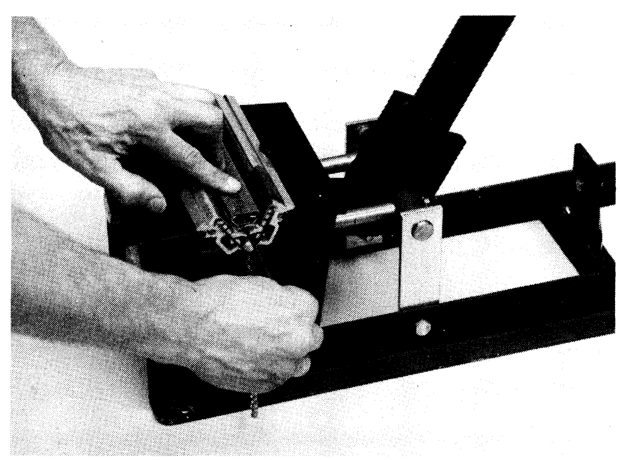


Figure 8-22

A2005-7

Each lacing card has 45 hooks. In order to join the ends of the belt evenly, one end must have 44 hooks, so when lacing the "trailing" end of the belt, eliminate one hook, 1.

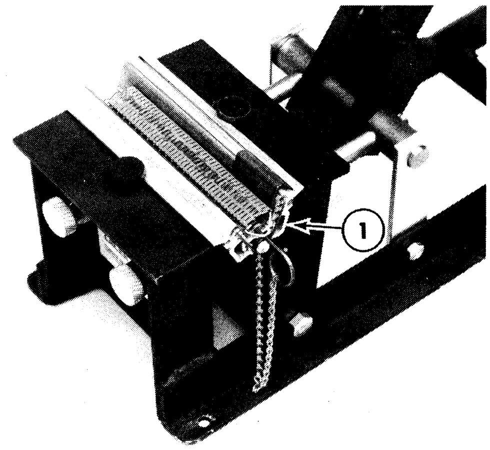


Figure 8-23

A2006-3

Remove the carding paper from the hooks with the tool shown (see Item 4, 8-18) with any other means at hand.

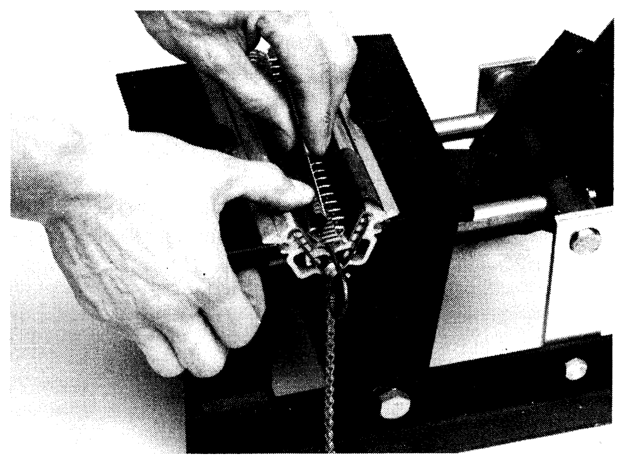


Figure 8-24

A2005-6

Center the belt between the end hook points and against the bottom of the lacer. Locate the two pressure plates, 2, as shown.

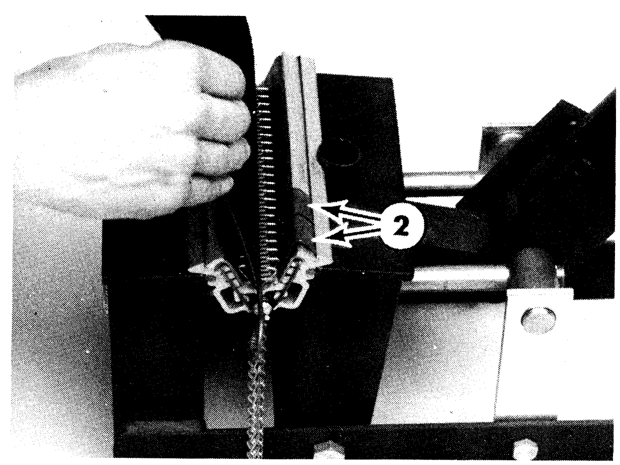


Figure 8-25

A2005-12

Press down the handle until it contacts stop, 1.

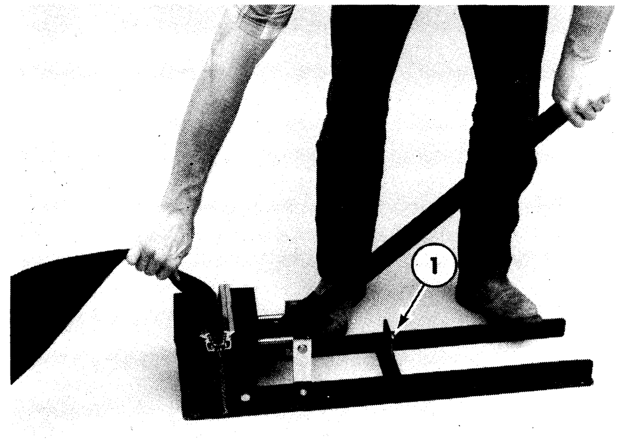


Figure 8-26

A2005-11

Raise the handle and relocate the pressure plates, 2, inward to the next area where hooks have not been clinched. Close the handle. Repeat this process until all hooks have had contact with the pressure plates.

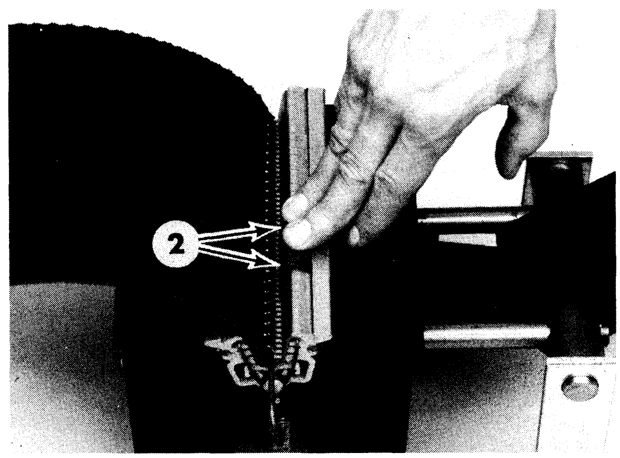


Figure 8-27

A2005-9

Before removing the lacer pin, inspect the lacing from the underside. If properly laced and clinched, the hook legs will be parallel with half of the hook diameter embedded into the belt. The tips of the hook points should have penetrated through the belt. If the lacing has not been clinched sufficiently, tighten the knobs, 3, evenly until correct clinching is observed. Remove the lacer pin.

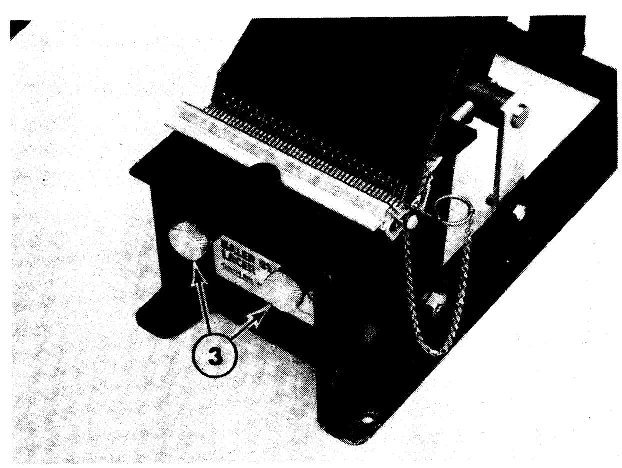


Figure 8-28

A2006-4

For the trailing end of the belt(s), chamfer the corners as shown in Figure 8-29.

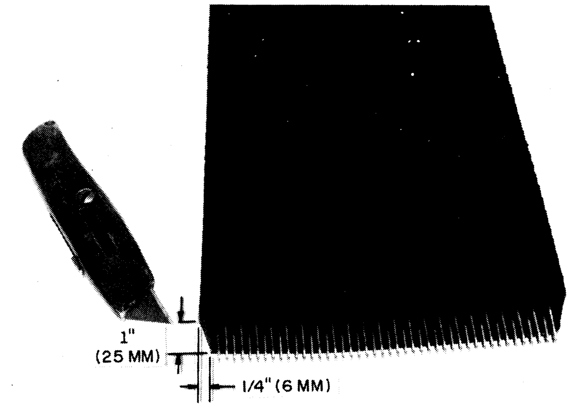


Figure 8-29

A2006-2

Thread the belts around the rollers, as shown in Figure 8-30, with the textured surface facing outward (the smooth surface positioned against all but two rolls). Thread in the direction such that the ends of the belt containing chamfers beside the lacing hook points in the direction the belt travels in operation.

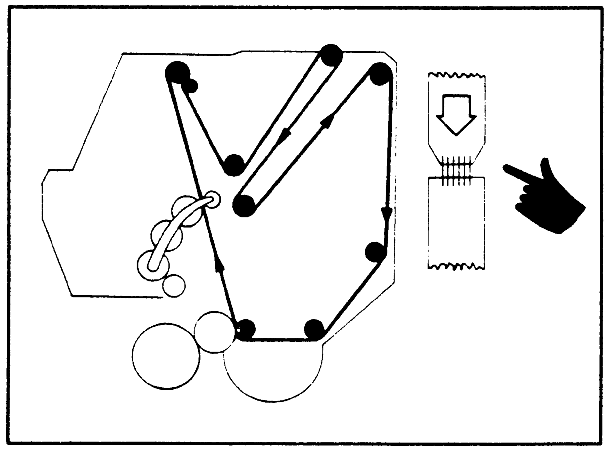


Figure 8-30

Install the lacing cable and crimp a ferrule on each end next to the outer lacing hook. To properly crimp the ferrules, special crimping pliers have been developed and are recommended for this application. The pliers shown in Figure 8-32 are available from:

Service Tools
655 Eisenhower Drive
Owatonna, MN 55060
Call 800-533-0492 (fax #800-283-8665)
Order number: FNH00250

After completing the lacing cable installation, belt tension must be reapplied to the belts before operation.

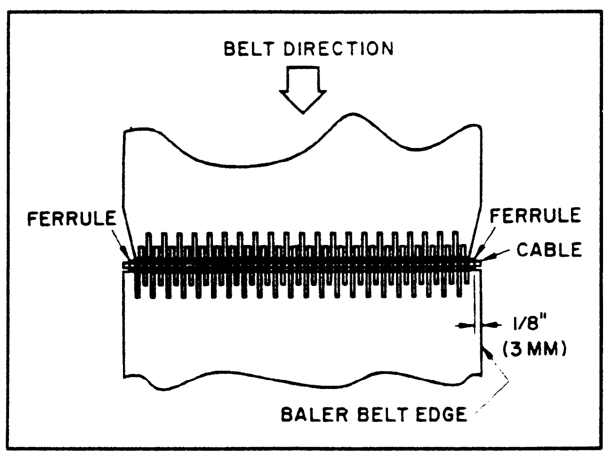


Figure 8-31

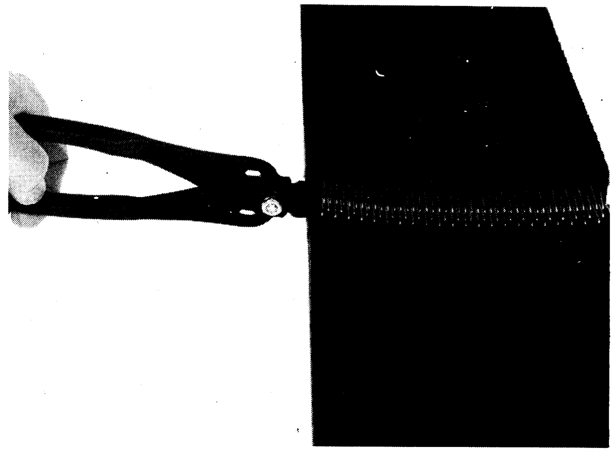


Figure 8-32

A2004-10

Models 634 and 644

Raise the tailgate and remove bolt, 1. Lower the tailgate. Replace the bolt in the storage position.

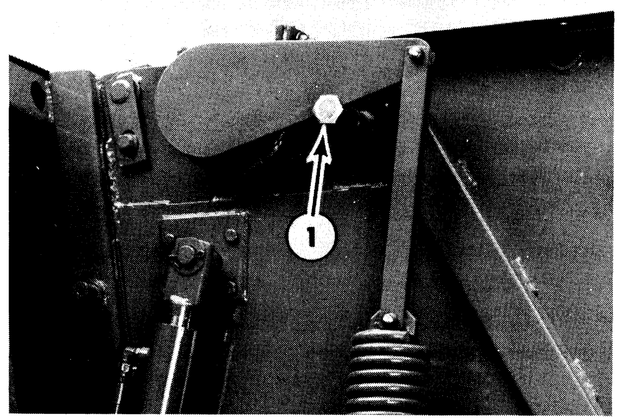


Figure 8-33

A1495-4

Models 654 and 664

Open the tailgate far enough to release pin, 1, and rotate handle, 2, to replace the pin in the stored position. Close the tailgate.

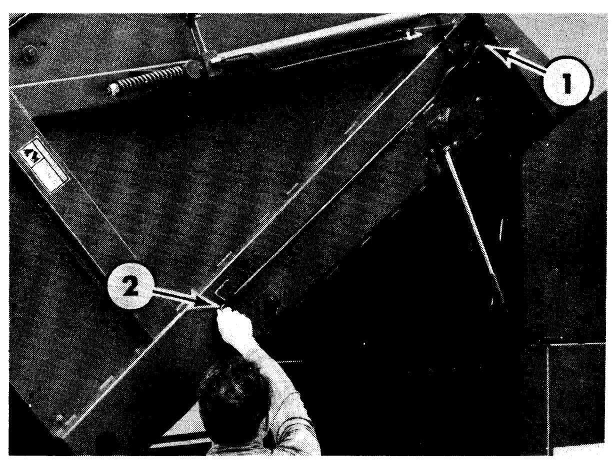


Figure 8-34

A2361-11

Release lockout lever, 1, and lower the tailgate to the closed and latched position.

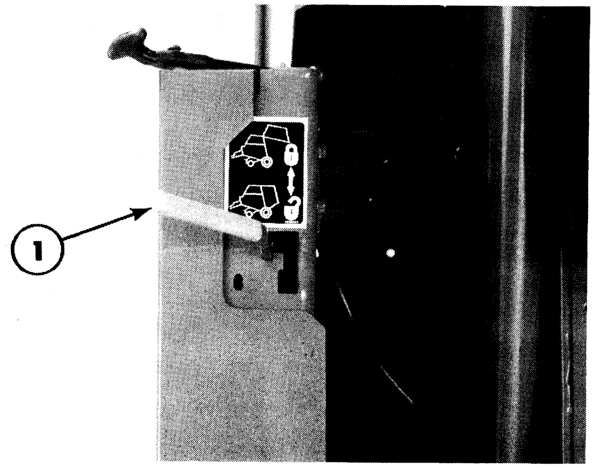


Figure 8-35

A3974-9

BELT TRACKING

In normal operation, the belts will move side to side and rub the belt guides. If the bale chamber is not filled uniformly, the belts may shift enough to curl against the guides and can flip over. Belts will also track poorly if material wraps or builds up on the rollers.

The belts may wear grooves in the sledge frame near the follower roll after extended use or if the belts track to the side. The groove should be filled with weld and ground to remove rough spots.

NOTE: If the belts flip over, loosen belt tension and turn the belts back over. The belts will not be damaged by being flipped. The lacings and lacing cables may be damaged, however, and should be repaired to prevent damage to the belts.

If all of the belts consistently shift towards the same side, the tracking must be adjusted. To adjust the tracking, remove the tension from the belts.

Model 634

If the belts are crowding to the right side, loosen cap screw, 1, and lower the roll right side or raise the left side of the tailgate roll. Tighten the cap screw. Raise the tailgate and replace the bolt in the storage position. Lower the tailgate.

Engage the PTO and observe the location of the apron belts. If the roll was moved too far, loosen the cap screw and move the roll in small increments. If the belts track improperly, it may be necessary to adjust the upper roll by loosening cap screw, 2, and move the roll to the front or rear, as required.

If individual belts are still not running true, relocate belts from other positions for best operation.

Figure 8-36

A4116-12

Model 644

Loosen cap screw, 1, holding the tailgate roller. Raise the roll slightly to shift the tracking toward that side of the machine. Lower the roll to shift tracking away. The adjustment can also be made on the other side of the machine.

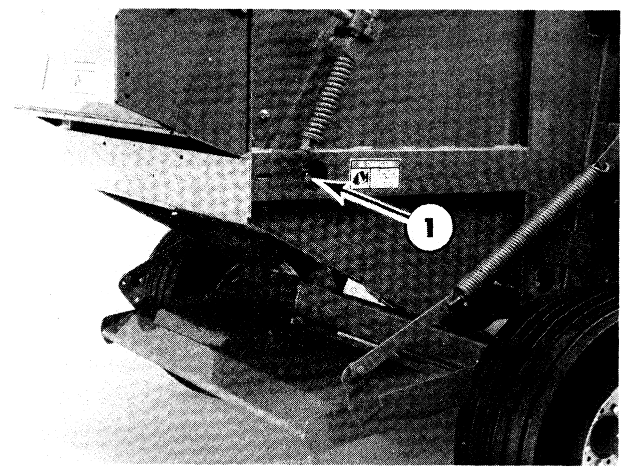


Figure 8-37

A4102-13

Models 654 and 664

Loosen cap screw, 1, holding the rear tailgate roller. Raise the roll slightly to shift the tracking toward that side of the machine. Lower the roll to shift tracking away. The adjustment can also be made on the other side of the machine. If additional adjustment is necessary, adjust the lower roll at 2.

NOTE: If 1 or 2 belts are tracking differently than the others, those belts can be shifted to other positions on the baler.

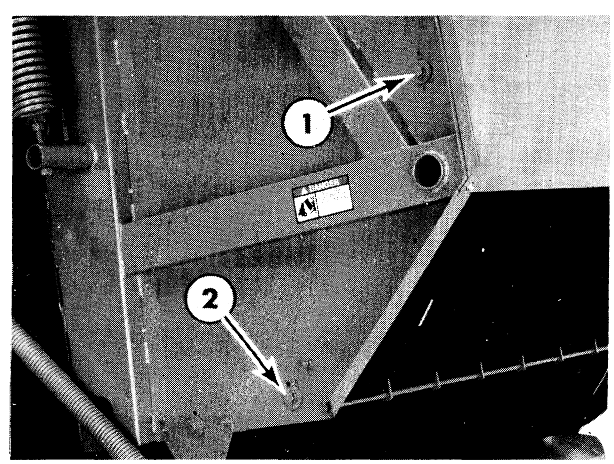


Figure 8-38

A1335-11

ENDLESS BELTS

REPAIR AND REPLACEMENT

Repair

Endless belts can be temporarily repaired using a short 6′ (1828 mm) belt section and the same lacing as the laced belts. See “Belt Lacing Instructions” earlier in this section.

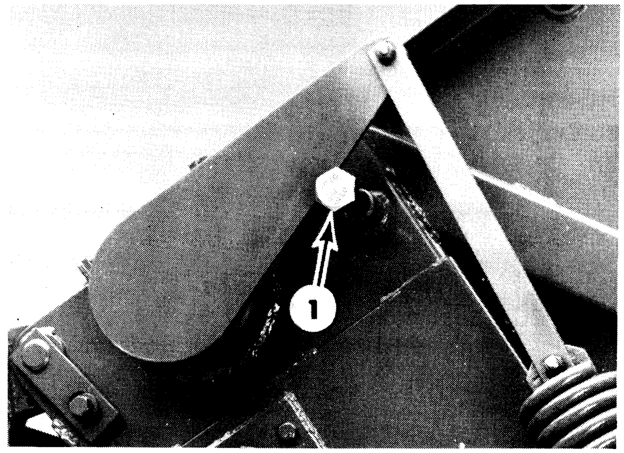


Figure 8-39

A1495-3

Replacing Endless Belts

To replace a single belt requires the same procedure as replacing a complete set. After replacement, relocate the single belt to a center position.

NOTE: Installation requires TWO people and the following special tools:

Overhead hoist or forklift
6′ (182 cm) step ladder
Bearing puller

NOTE: Most of the figures show replacement of the endless belt on the Model 664. Only minor differences exist for installation on the Models 644 and 654.

Removing Belt Tension - Model 644

Open the tailgate far enough that the stored bolt, 1, can be installed. Lower the tailgate.

Models 654 and 664

Open the tailgate far enough that lock-out pin, 1, can be placed under the take-up arm by moving the handle at 2. Lower the tailgate.

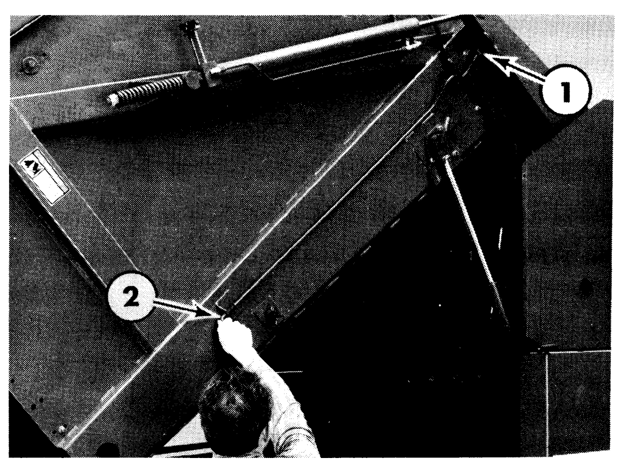


Figure 8-40

A2361-11

Remove the four carriage bolts securing front belt guide, 3, if equipped. If the original belts were laced, remove the lacing cables and belts from the baler.

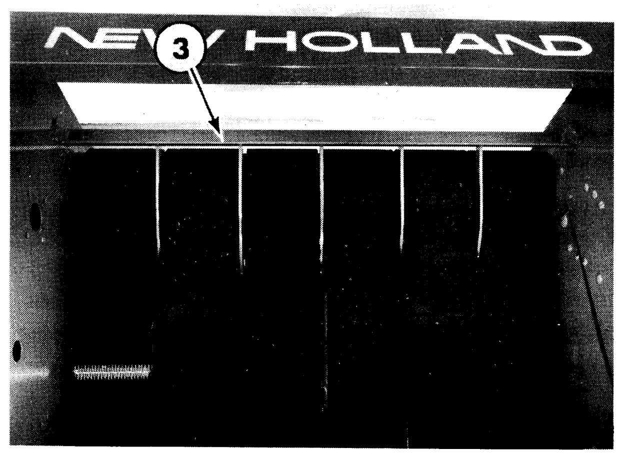


Figure 8-41

A1784-8

From inside the baler, manually move pivot arm assembly, 1, Figure 8-42, forward against the stop.

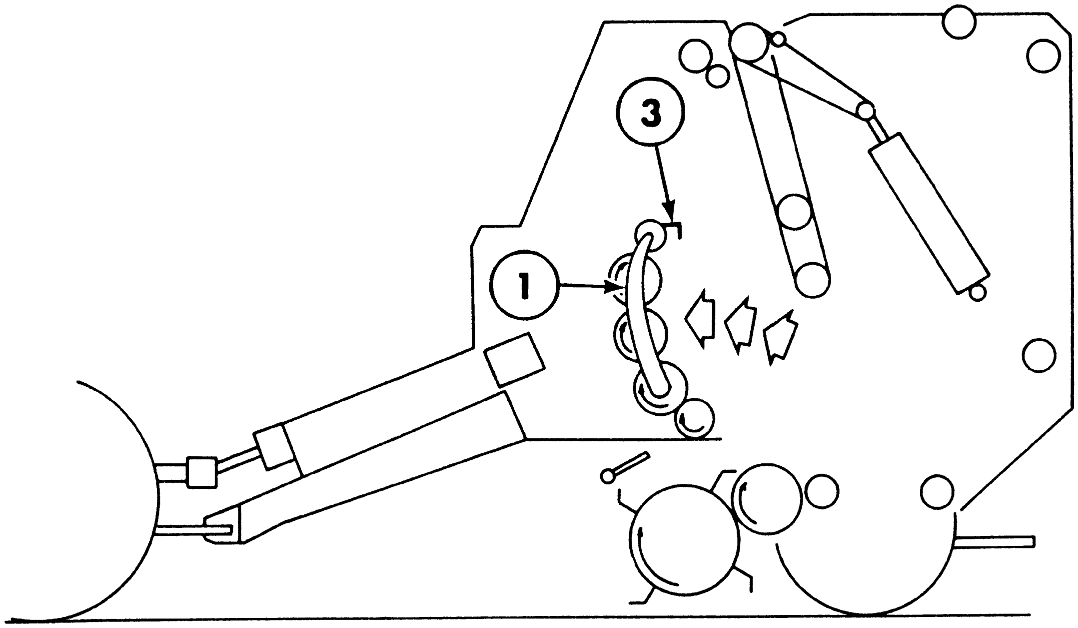


Figure 8-42

From each side of the baler, remove the two cap screws, 2, Figure 8-43. Remove the follower roll scraper assembly, 3, Figure 8-42, from inside the baler.

On the left-hand side, loosen cap screw, 4, Figure 8-43. On the opposite side, remove cap screw, 4, and hub, 5.

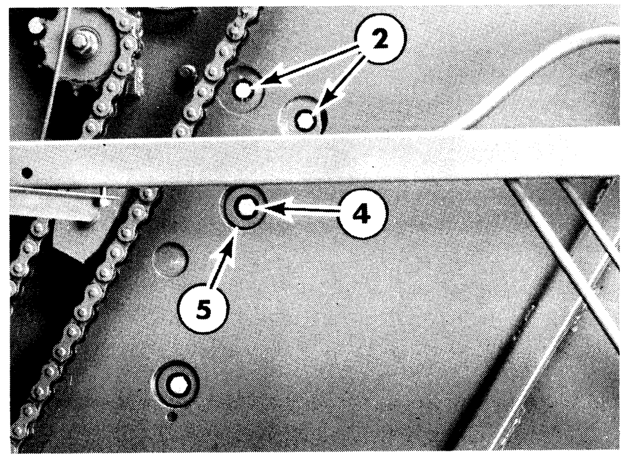


Figure 8-43

A1058-6

NOTE: If the hubs are hard to remove, a punch or pry bar shortened to only extend 1/8″ (4 mm) through the hub can be effective.

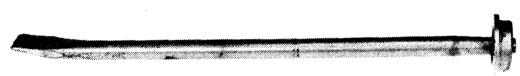


Figure 8-44

A2049-5

On the left-hand side, loosen the spring tension at 6. Remove the drive roll chain at 7. Remove the grease line fitting, cap screw end cap, spring, and outer clutch hub from the declutch at 8. Remove pivot bolt, 9, and allow the clutch pivot to hang from the spring. See Figure 8-46.

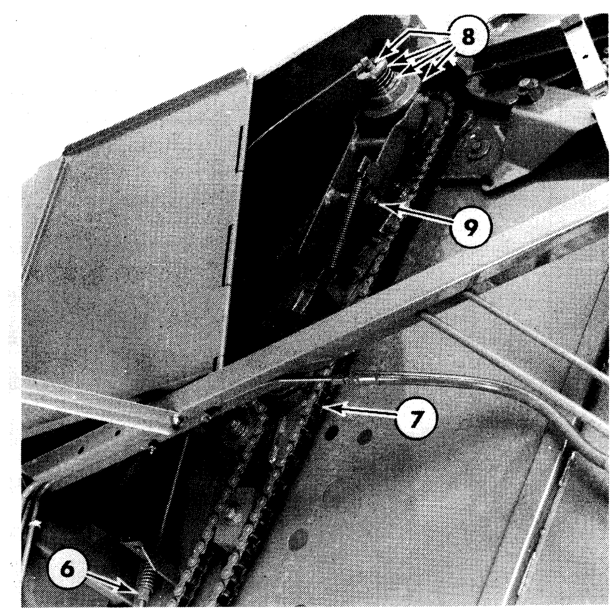


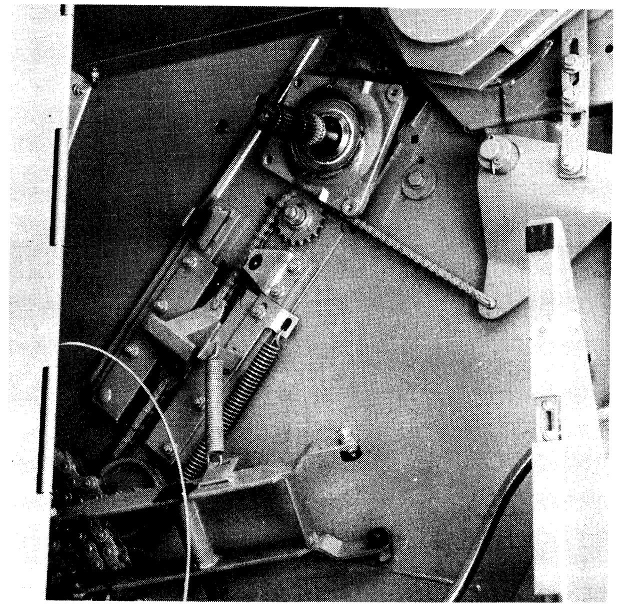
Figure 8-45

A1086-5

Remove the four cap screws and two nuts securing the bearing and housing to the frame. Pull the bearing and housing off the shaft until the bearing housing is free of the main frame by approximately 3/4″ (19 mm).

NOTE: A long jaw puller is normally required.

On the right-hand side, using an overhead hoist or forklift, install a chain around the right-hand end of the drive roll. Remove the drive roll cap screw and end cap.



A2048-5

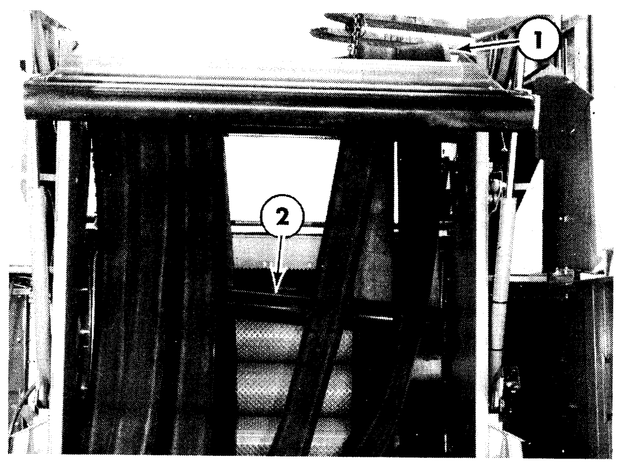
Figure 8-46

Lift the end of drive roll, 1, above the main frame. Install the new belts over the end of the drive roll, as shown in Figure 8-47.

NOTE: Be sure the belts are installed with the directional arrows on the belts pointed to go rearward in the direction of the tailgate rolls.

At the same time that each belt is installed on the drive roll, it should also be placed under the right-hand end of follower roll, 2.

After all the belts have been installed, lower the drive roll, replace all bearing hardware, and declutch drive components.



A2048-6

Figure 8-47

Reinstall the right-hand follower roll end cap and cap screws, being sure to locate the detent hole in the bearing caps.

NOTE: The drive roll, end cap hardware, and follower roll hardware should have 242 Loctite or similar thread-lock material applied to the threads and torque to 72 ft. lbs. - 76 ft. lbs. (98 N·m - 103 N·m).

Replace the scraper assembly, 3, Figure 8-42, on the sledge frame and torque the cap screws to 41 ft. lbs. (56 N·m). Close the tailgate.

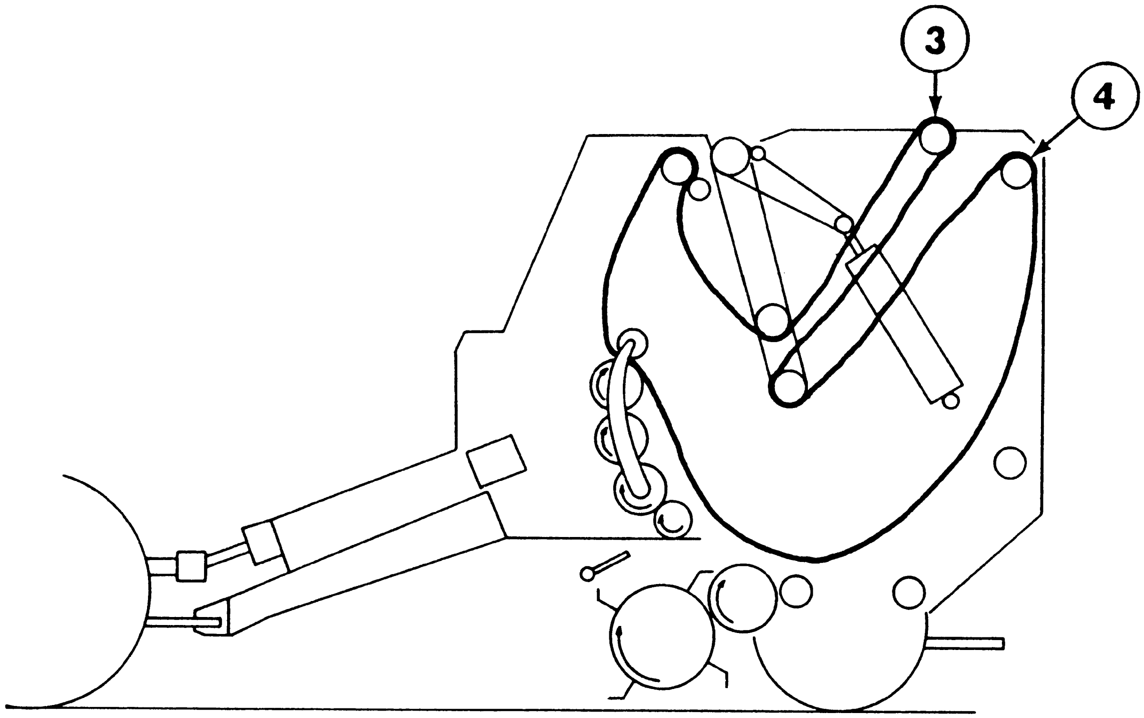


Figure 8-48

Relocate the hoist or forklift to the two upper rear tailgate rolls, 3 and 4, Figures 8-48 and 8-49. Loosen the cap screws on the left-hand side of rolls, 3 and 4. Secure each roll with a chain or strap and remove the cap screw and end cap from the right-hand side of each roll. With the hoist, lift the free end of each roll to clear the side sheet. Route each belt, starting from the left side, over each roll, as shown in Figures 8-48 and 8-49. Reinstall rolls, 3 and 4. Locate bearing cap detent holes and torque the cap screws to 66 ft. lbs. (90 N·m).

NOTE: Loctite 242, or its equivalent, should be used on all roll hardware.

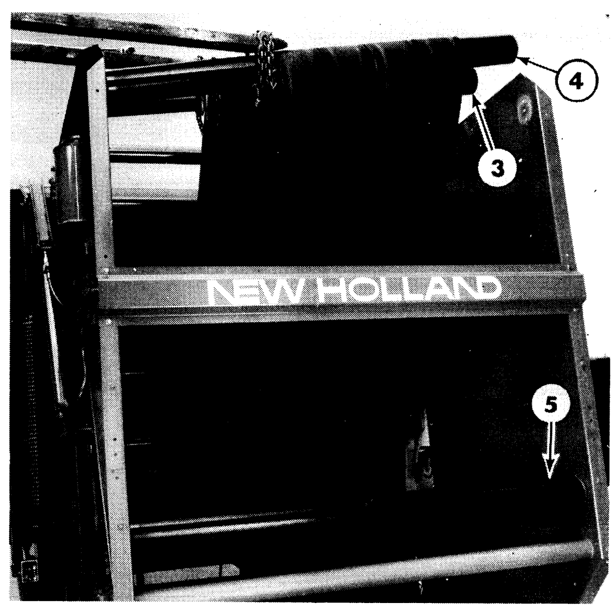


Figure 8-49

A2048-11

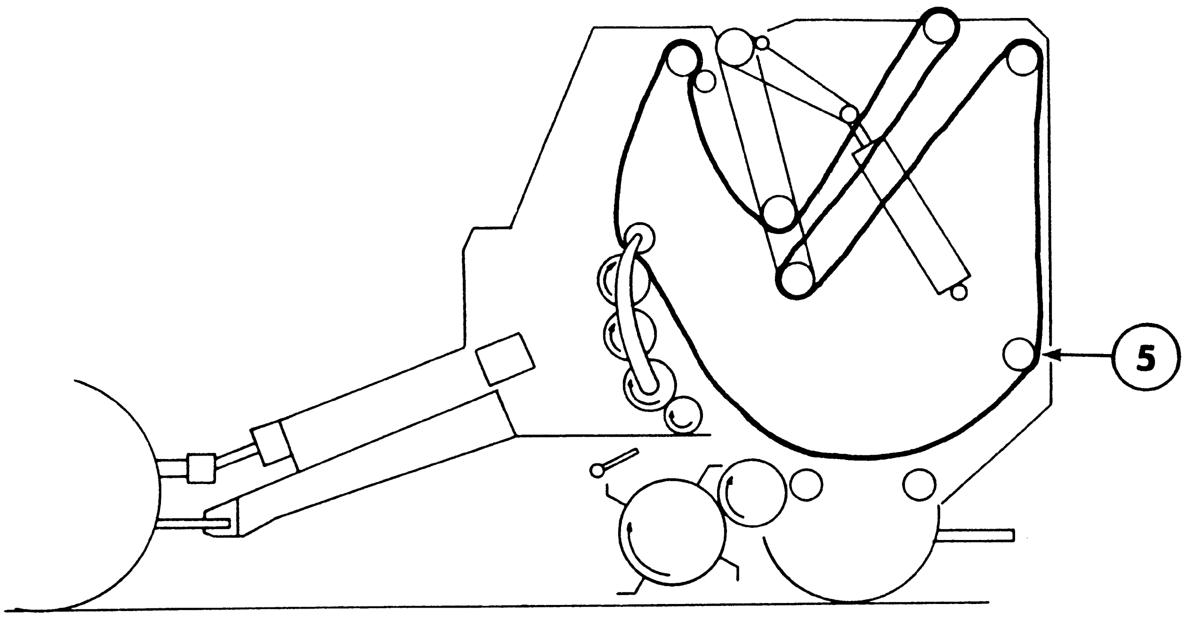


Figure 8-50

Remove the hardware from both ends of roll, 5, Figure 8-50. Manually remove the roll assembly and thread all belts over the roll and reinstall into the tailgate.

Replace bearing hardware, lining up detent holes in the bearing caps and locate the roll in the middle of the slot on each side. Snug both cap screws. Final tightening will be performed after belt tracking adjustments have been made.

Raise the tailgate, as shown in Figure 8-51, and remove belt guide, 6; roll, 7; nose roll scraper, 8; and nose roll, 9, from the baler.

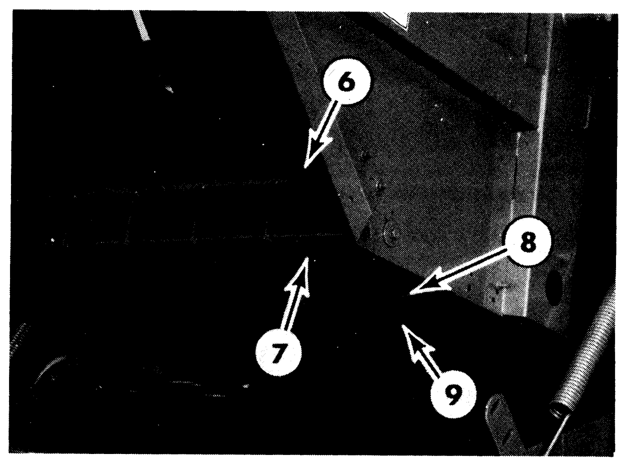


Figure 8-51

A2048-9

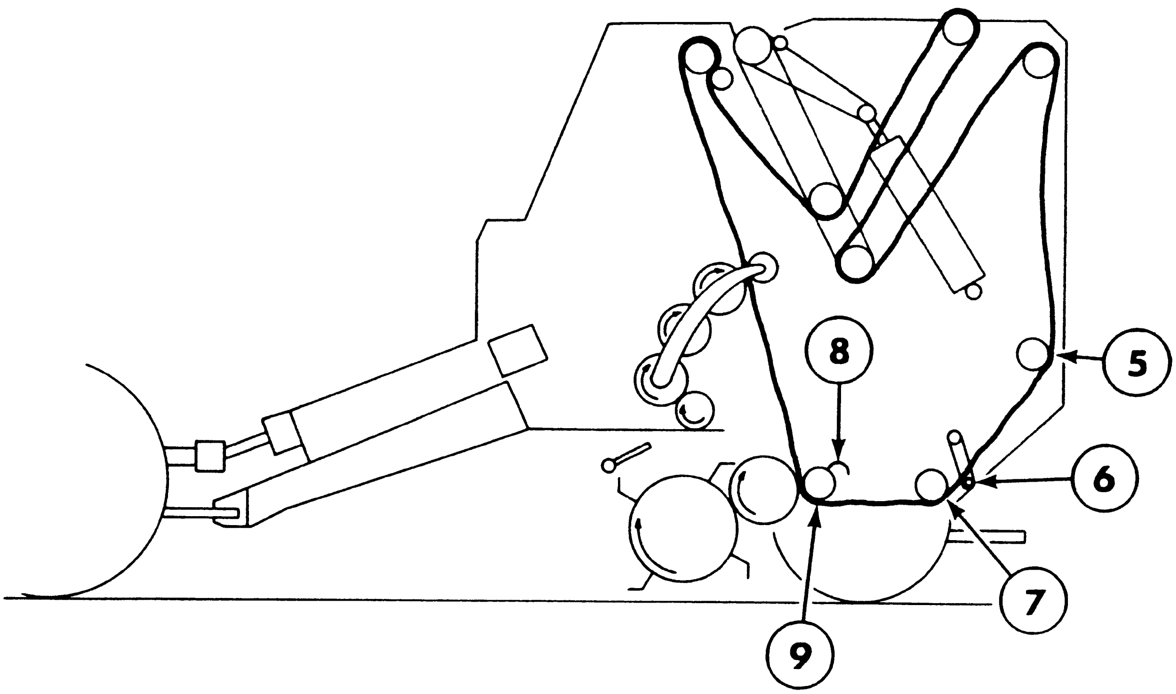


Figure 8-52

Thread nose roll, 9, Figure 8-52, through all belts and reinstall aligning bearing support detent holes and torquing cap screws to 66 ft. lbs. (90 N·m).

NOTE: Loctite 242, or its equivalent, should be used on all roll hardware.

Reinstall the nose roll scraper assembly, 8, Figure 8-52. Adjust the scraper to the nose roll to just clear at the tightest point of nose roll rotation. Install roll, 7, in the same manner as the nose roll, but locate the roll at the middle of the slots.

Replace the belt guide and rod, 6, Figure 8-52. Raise the tailgate and remove the locking device. See Figure 8-40. Lower the tailgate.

Slowly engage the tractor PTO and observe belt tracking. If adjustment is required, move roll, 5, no more than 1/8″ at a time until tracking is achieved. See "Belt Tracking," earlier in this section.

NOTE: All belts will wander until sufficient tension is applied. After belts are tracked so they basically are all running straight, no further adjustment should be made until field start-up.

If the unit was equipped with a front belt guide, do not reinstall.

LABOR GUIDE

	HOURS
Single Belt Replacement	0.50
Single Belt Removal and Replacement	0.30
Belt Tracking Adjustment	0.70
Replacement of Single Endless Belt	7.50
Replace Complete Set of Endless Belts	8.00
Install Repair Section	0.70
Replace a Lacing Cable	0.10

INDEX

SECTION 9

SLEDGE ROLL GROUP

Section 9 describes the removal, repair, and assembly information of the sledge assembly. Figure 9-1 shows the location of these components.

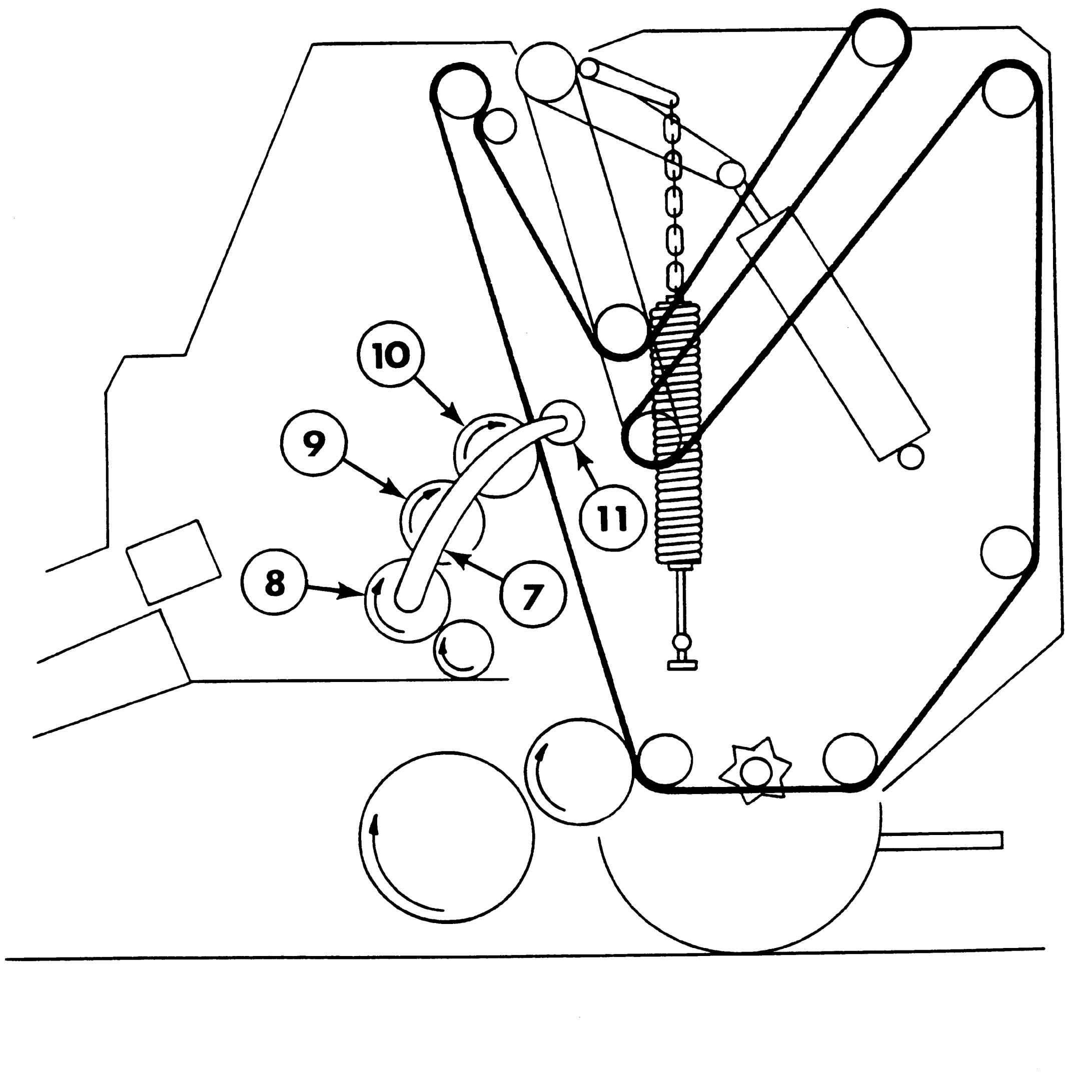


Figure 9-1

FOLLOWER ROLL - 11

Model 634 - Removal

Release all of the tension on the apron belts by loosening jam nut, 1, and removing lower spring bolt, 2, on each spring assembly.

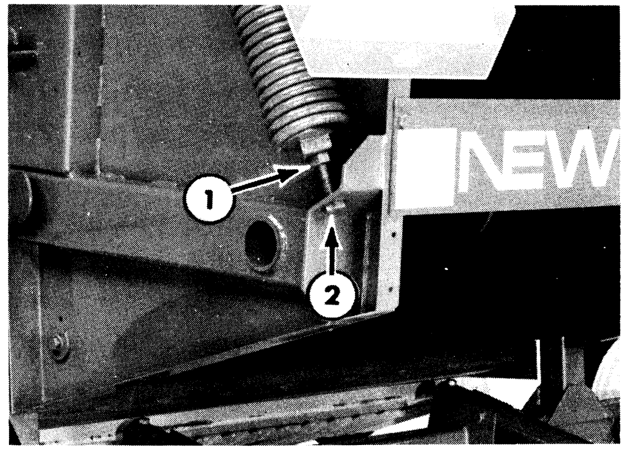


Figure 9-2

362-12

Raise the tailgate and lower safety locks, 3.

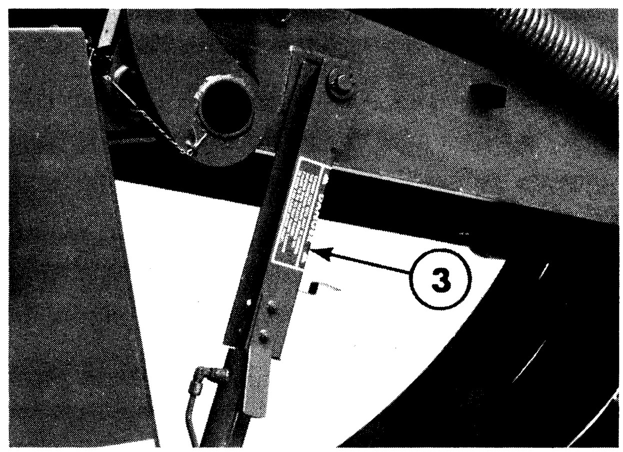


Figure 9-3

A320-9

Pivot the sledge frame forward until cap screw, 4, that secures the follower roll, lines up with the slot in the main frame.

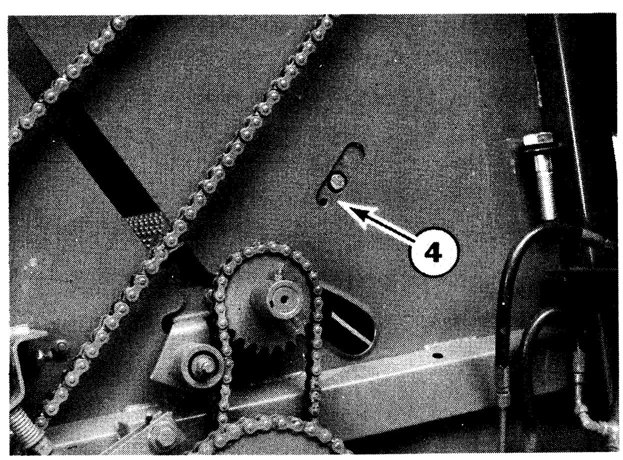


Figure 9-4

320-11

Secure the sledge roll with a cap screw and nut, 5, to hold the sledge roll in position.

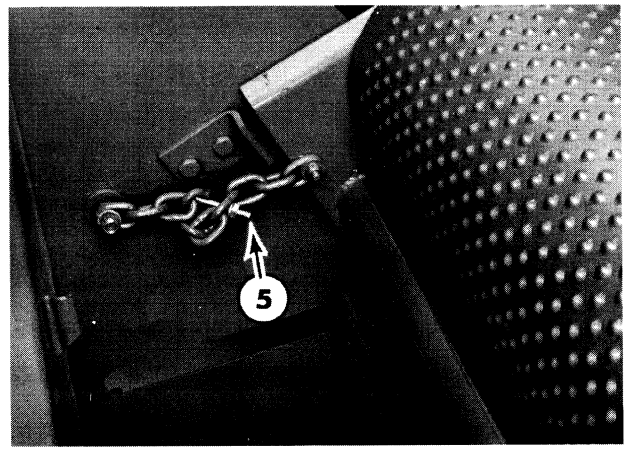


Figure 9-5

320-12

Remove the cap screw from each end of the follower roll, as shown. The roll can then be removed from the baler.

NOTE: If the bearing cap turns, a punch can be placed in hole, 6, to hold the bearing cap from turning.

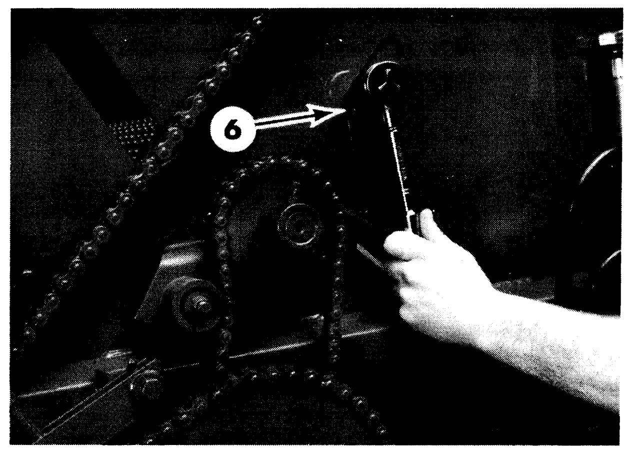


Figure 9-6

320-10

The roll can now be disassembled by removing bearing cap, 1, Figure 9-7, and seal, 2. Bearing, 3, can now be removed from roll, 4. Newer units will have bearing, 4, Figure 9-8; shield, 3; O ring, 2, and bearing cap, 1.

NOTE: Early units can be updated to the new style if all parts, including the roll, are replaced with the new-style parts.

FOLLOWER ROLL INSTALLATION

Replace the bearings and the follower roll in the reverse order of removal. Check the following items during installation:

Make certain the bore of roll, 4, Figure 9-7, is clean with all paint and dirt removed in the bearing area. Seat bearing, 3, properly.

Make certain bearing caps, 1, Figures 9-7 and 9-8, will slide into bearing, 3.

Fill the cavity between shield, 3, Figure 9-8, and bearing, 4, with grease.

Torque cap screw, 4, Figure 9-4, on each side of the follower roll to 67 ft. lbs. (91 N·m).

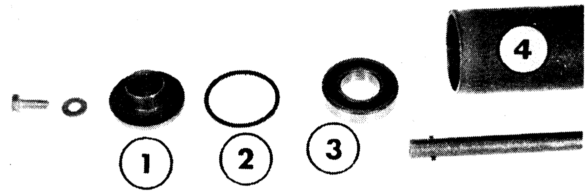


Figure 9-7

321-2

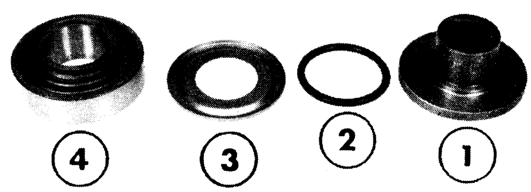


Figure 9-8

1035-1

FOLLOWER ROLL REMOVAL

Models 644, 654, and 664

Tension on the belts must be removed before working on the follower roll.

Model 644

To remove belt tension on the Model 644:

Open the tailgate far enough that bolt, 1, Figure 9-9, stored on the left side of the frame can be installed under the spring attaching arm, as shown at 1, Figure 9-10.

Lower the tailgate. The bolt will hold the take-up arm up to remove tension from the belts.

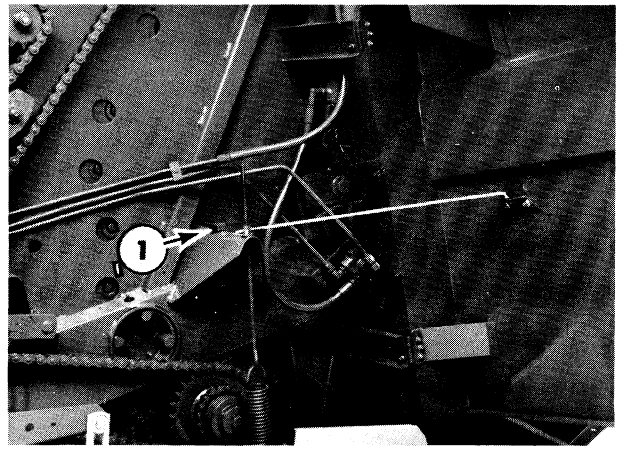


Figure 9-9

1633-12

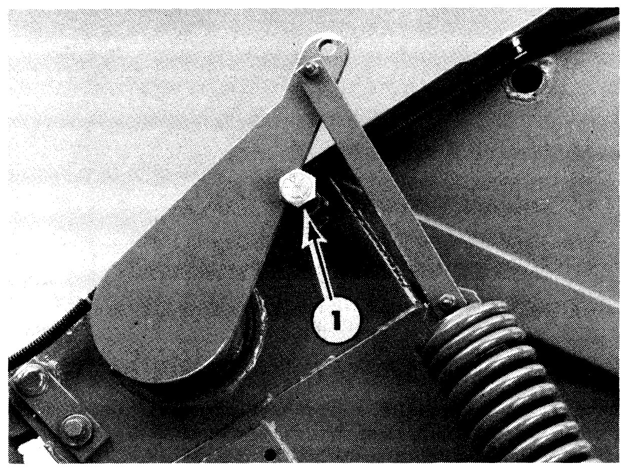


Figure 9-10

A4398-11

CAUTION: IF THE TAILGATE IS NOT LOWERED COMPLETELY, PLACE TAILGATE LOCKOUT VALVE, 2, FIGURE 9-11, IN THE UPPER, LOCKED POSITION.

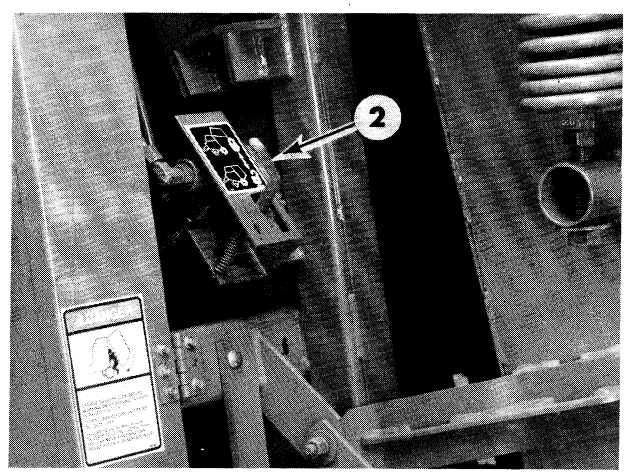


Figure 9-11

A4398-12

Models 654 and 664

To remove belt tension:

Open the tailgate far enough that lockout pin, 1, can be placed under the take-up arm by moving the handle at 2.

Lower the tailgate. The pin will hold the take-up arm up to remove tension from the belts.

CAUTION: IF THE TAILGATE IS NOT LOWERED COMPLETELY, PLACE TAILGATE LOCKOUT VALVE, 2, FIGURE 9-11, IN THE UPPER, LOCKED POSITION.

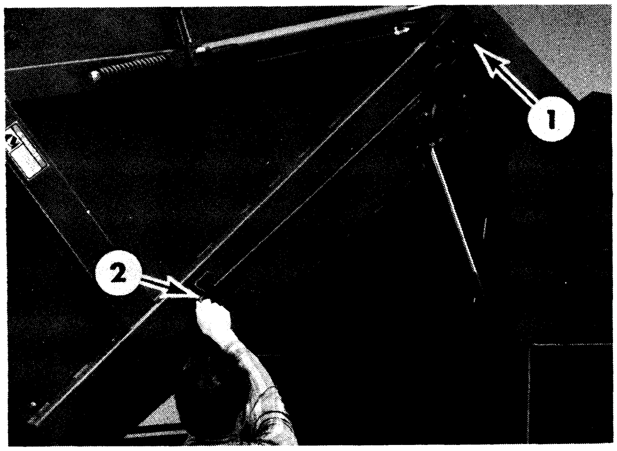


Figure 9-12

2361-11

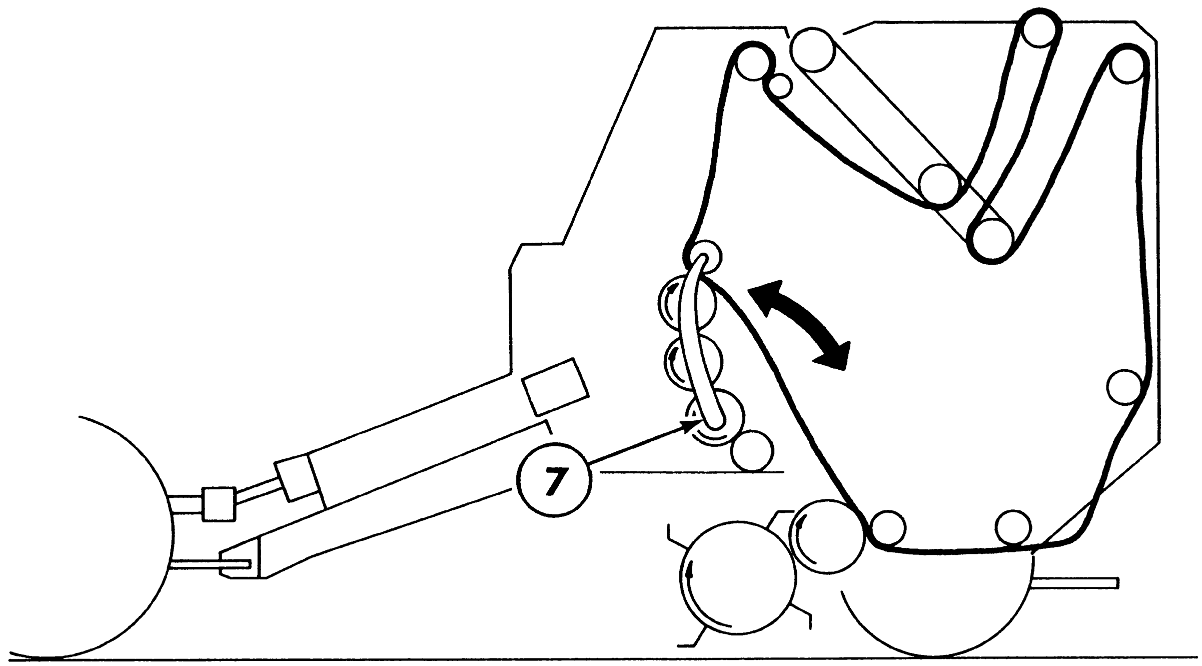


Figure 9-13

Manually rotate the sledge assembly forward, as shown in Figure 9-13. Temporarily secure the sledge forward and remove the locknut securing the limit chain at 1, Figure 9-14. Remove the limit chain.

NOTE: The limit chain is located on the left-hand side in back of the twine/net box.

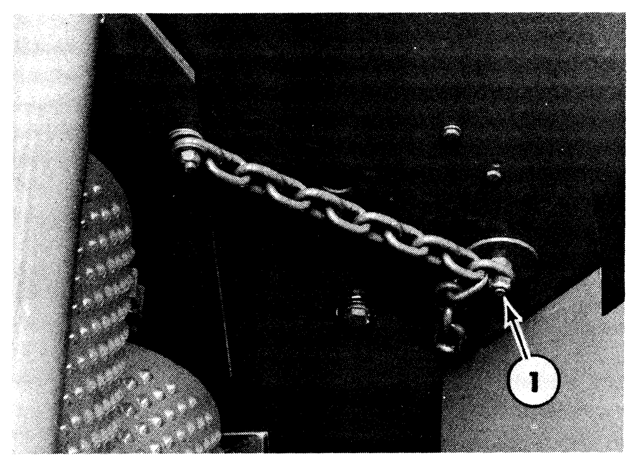


Figure 9-14

1495-11

If the baler is equipped with net wrapper, remove cap screw, 2, Figure 9-15 for Model 644 or Figure 9-16 for Models 654 and 664.

Remove the temporary method for securing the sledge assembly. Release the tailgate lock valve, if engaged, and raise the tailgate one-half to three-quarters open. Reengage lockout valve, 2, Figure 9-11.

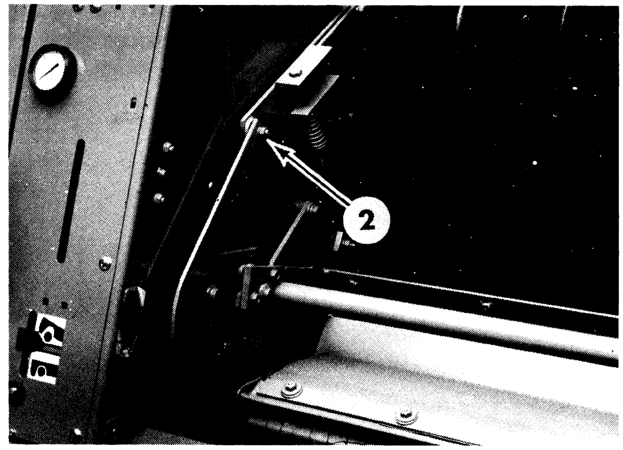


Figure 9-15

1636-4

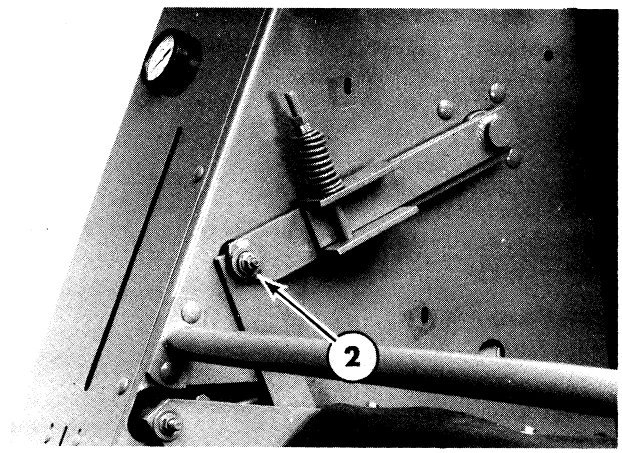


Figure 9-16

2756-13

The sledge assembly will rotate rearward when the tailgate is raised.

Remove cap screw, 3, and hub, 4, from each end of the roll.

NOTE: The scraper and hardware at 5 should be loosened to aid removal and installation of the roll assembly.

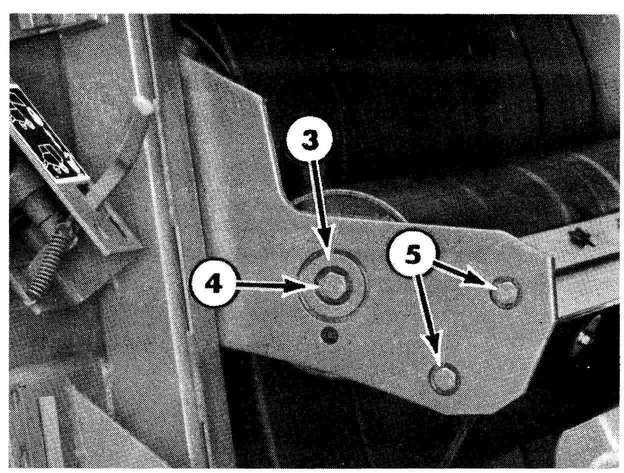


Figure 9-17

A4398-16

If difficulty is experienced removing the hubs, a shortened tapered punch, as shown in Figure 9-18, is effective.

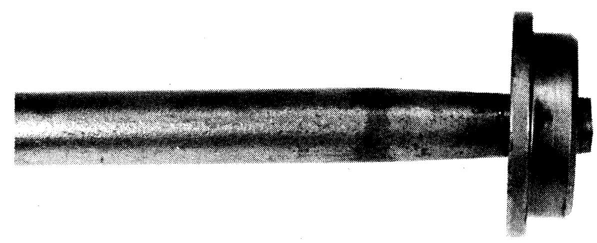


Figure 9-18

2049-6

INSPECTION

The follower roll assembly can now be removed.

Figure 9-19 shows the components of the follower roll assembly.

1 Roll
2 Bearing housing
3 Bearing
4 Support
5 Sledge frame
6 Hub
7 M12 x 40 cap screw

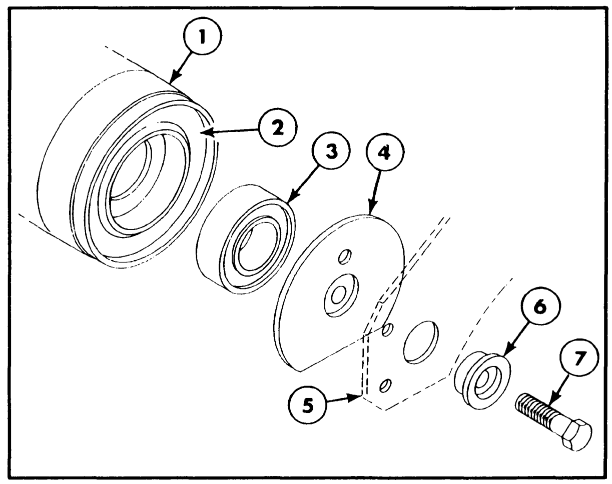


Figure 9-19

There are two styles of bearing assemblies:

Style I

Used on Model 644:

2 - Bearing housing
3 - Bearing (80 mm OD - 40 mm ID)
4 - Support
6 - Hub
7 - Cap screw M12 x 40
8 - Shield
9 - O ring

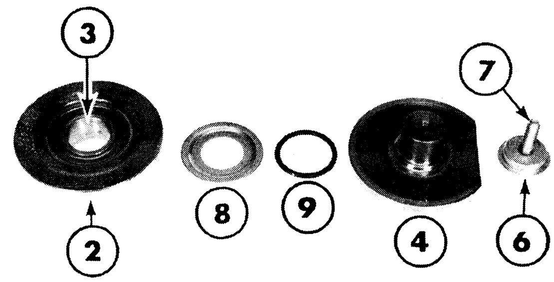


Figure 9-20

2740-11

Style II

Used on Models 654 and 664:

2 - Bearing housing
3 - Hex bore bearing (80 mm - 40 mm ID)
4 - Support
5 - Hub
6 - Cap screw (M12 x 40)

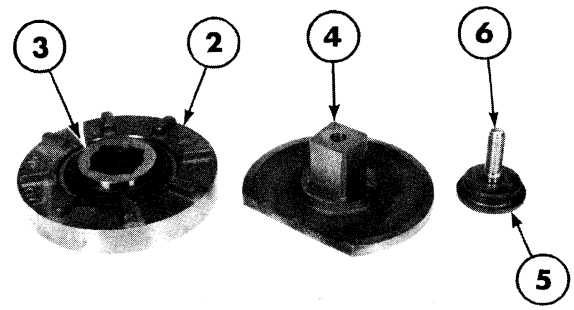


Figure 9-21

A4398-8

INSPECTION

Examine all components and replace any part which is suspect.

If the bearing shows signs of having spun in the cast housing, both the bearing and the housing should be replaced. Loctite the new parts using 242 or its equivalent between the bore of the roll and housing, as well as between the housing and the bearing.

If the inner bore of the roll indicates that the cast housing has spun, replace the complete roll assembly.

The hex bore bearing, 3, Figure 9-22, has a maximum allowable rotating torque of 6.9 in. lbs. (0.77 N·m).

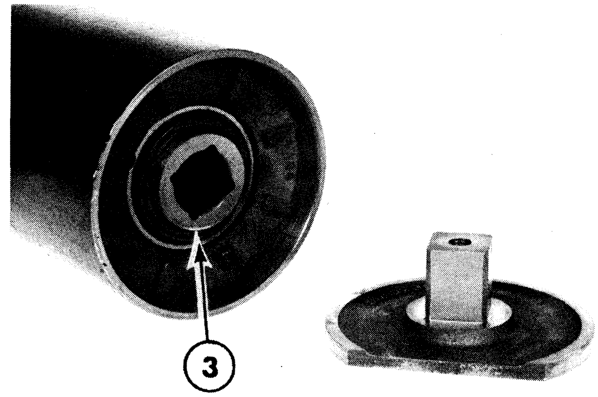


Figure 9-22

A4398-6

INSTALLATION

Replace the follower roll into the sledge frame. If difficult to install, loosen the scraper mount hardware at 5, Figure 9-23.

Install the hub, 4, into the sledge frame. Use Loctite 242 thread locker, or its equivalent, on the cap screws and torque to 72 ft. lbs. - 76 ft. lbs. (98 N·m - 103 N·m).

Release the tailgate lock-out and lower the tailgate. Manually, pivot the sledge assembly forward against the internal frame stop. Replace the limit chain, previously removed in Figure 9-14. Raise the tailgate and remove the lock pin or bolt. Lower the tailgate.

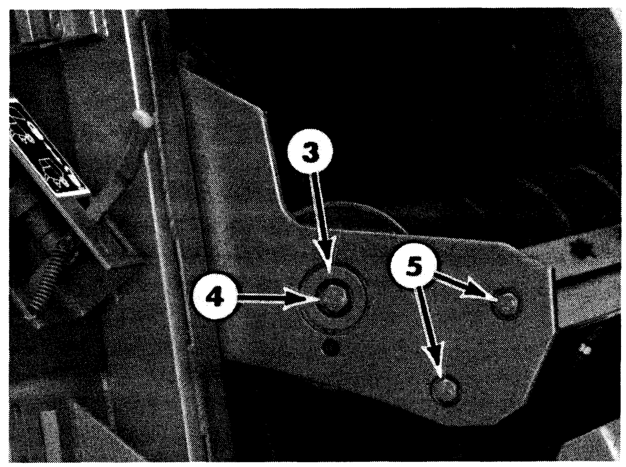


Figure 9-23

A4398-16

STRIPPER ROLL, 10, AND MIDDLE ROLL, 9, REMOVAL

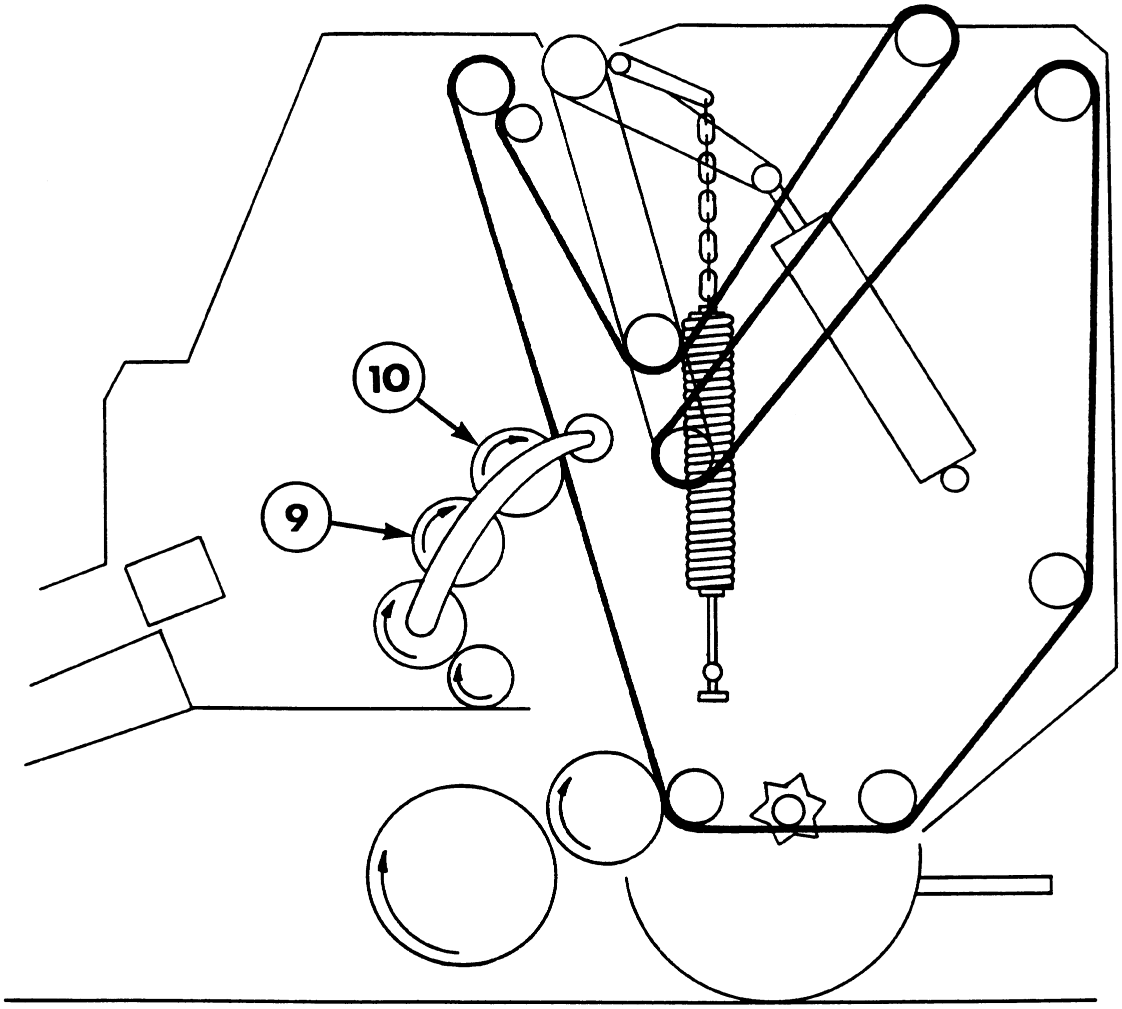


Figure 9-24

Model 634

Removal of the stripper roll on the Model 634 will be described with pivot roll removal in the next section.

STRIPPER ROLL REMOVAL - 10

Models 644, 654, and 664

Tension on the belts must be removed before working on the stripper roll.

Model 644

To remove belt tension on the Model 644:

Open the tailgate far enough that bolt, 1, Figure 9-25, stored on the left side of the frame, can be installed under the spring attaching arm, as shown at 1, Figure 9-26.

Lower the tailgate. The bolt will hold the take-up arm up to remove tension from the belts.

CAUTION: IF THE TAILGATE IS NOT LOWERED COMPLETELY, PLACE TAILGATE LOCKOUT VALVE, 2, IN THE UPPER, LOCKED POSITION.

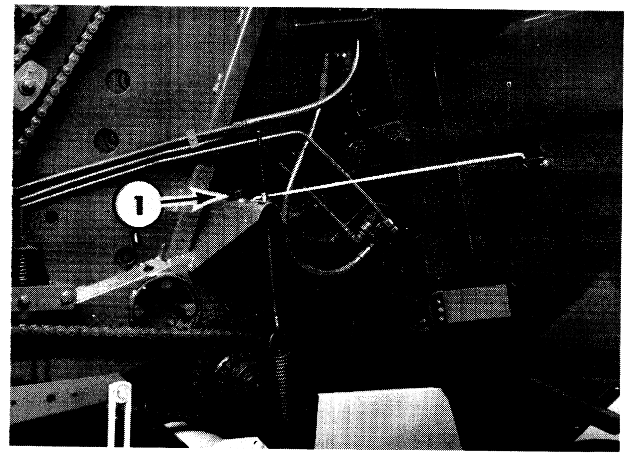


Figure 9-25

1633-12

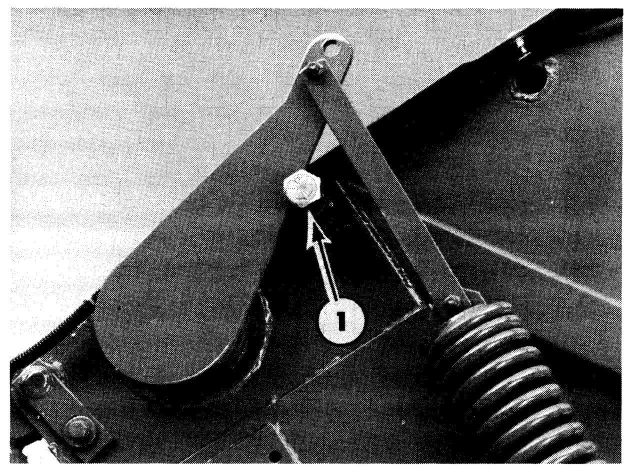


Figure 9-26

A4398-11

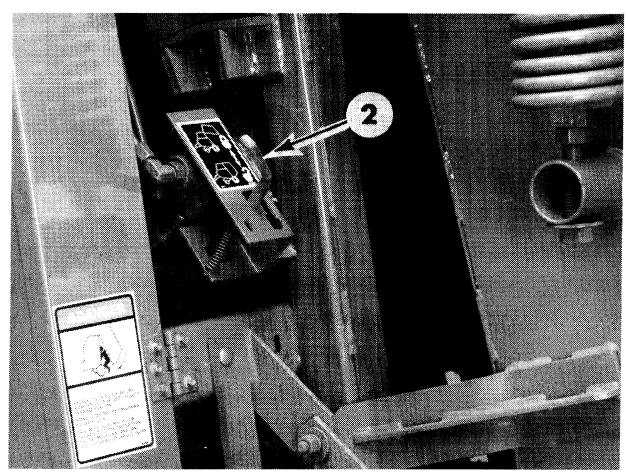


Figure 9-27

A4398-12

Models 654 and 664

To remove belt tension, open the tailgate far enough that lockout pin, 1, can be placed under the take-up arm by moving the handle at 2.

Lower the tailgate. The pin will hold the take-up arm up to remove tension from the belts.

CAUTION: IF THE TAILGATE IS NOT LOWERED COMPLETELY, PLACE TAILGATE LOCKOUT VALVE, 2, FIGURE 9-27, IN THE UPPER, LOCKED POSITION.

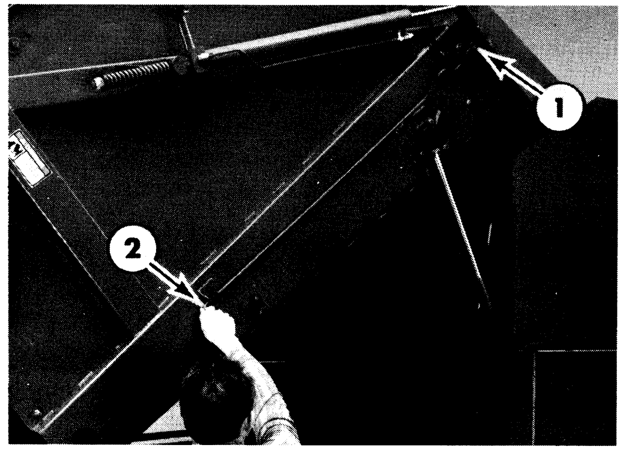


Figure 9-28

2361-11

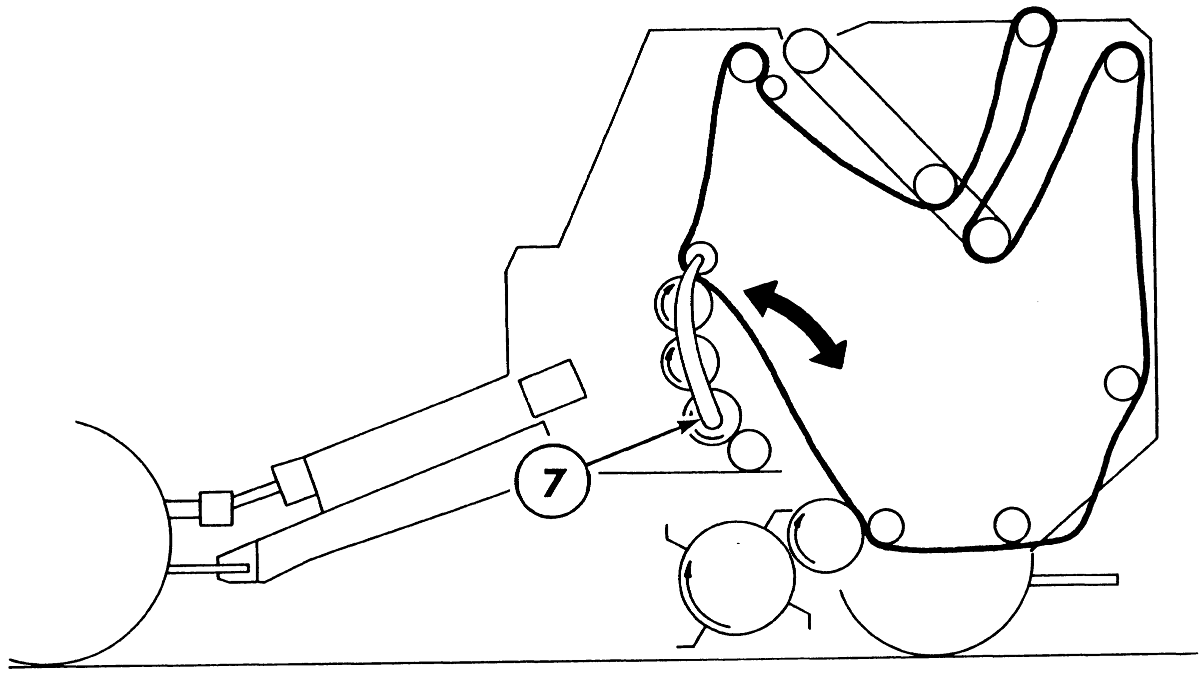


Figure 9-29

Manually pivot the sledge assembly, 7, Figure 9-29, forward to the stop. Secure in this position with rope or other means. In this position, the hardware to all sledge roll assembly components is exposed. See Figure 9-30.

Remove the cap screw from each end of the stripper roll at 1, Figure 9-30. Remove the hub, 2, to free the bearing support from the sledge frame.

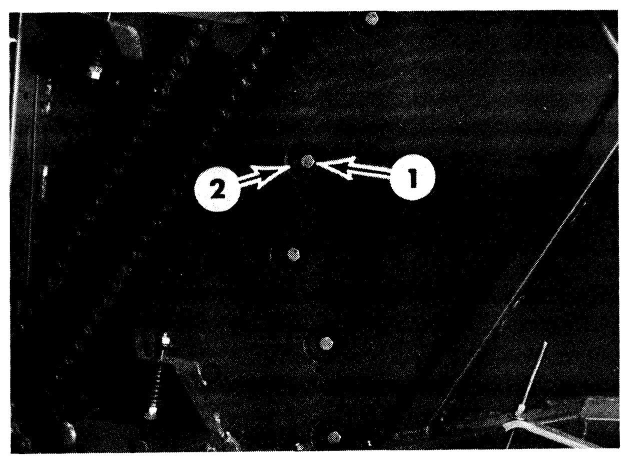


Figure 9-30

1058-6

NOTE: If the hub cannot be removed, a pry bar, shortened, as shown, will normally make the job much easier.

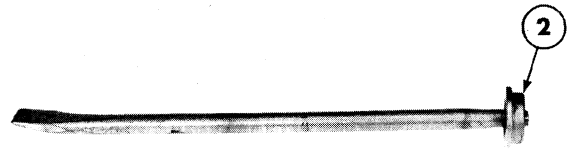


Figure 9-31

2049-5

Open the tailgate and place tailgate lockout valve, 2, Figure 9-27, in the upper locked position. Remove cap screws, 1, Figure 9-92, and shield.

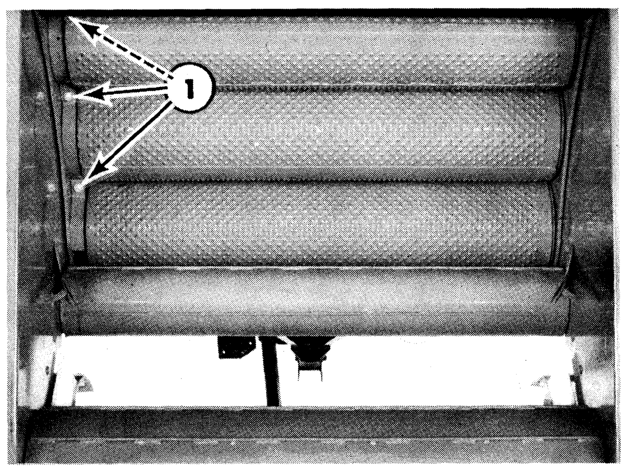


Figure 9-32

A4398-13

Using a pry bar, as shown, pivot the stripper roll to the rear on the right-hand side first. The roll assembly can now be removed from the baler.

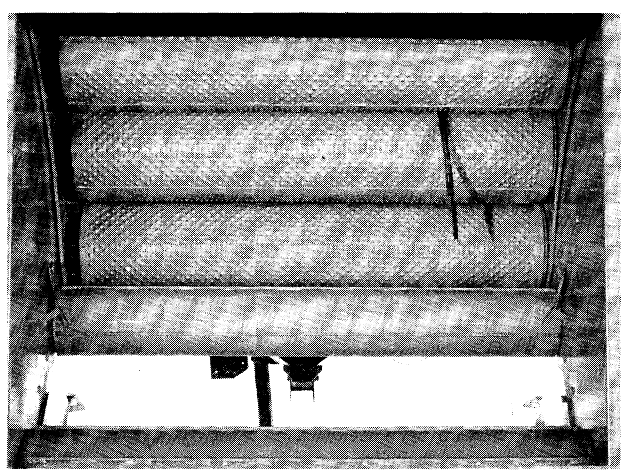


Figure 9-33

A4399-3

MIDDLE ROLL REMOVAL - 9

NOTE: To remove the middle roll, the stripper roll and idler must be removed first.

To remove idler assembly, 1, Figure 9-34, remove the M12 x 30 cap screw at 2, Figure 9-35. Replace with M16 x 45 mm or M16 x 50 mm bolt, which will thread into the bearing mount. Tightening the M16 cap screw will separate end cap, 4, Figure 9-34, from the outer mount.

NOTE: Tapping the end cap is also required to free the two components. After the inner hub is free of the mount, the idler assembly can be removed. Remove the M16 cap screw.

Remove the middle roll in the same manner as the stripper roll. Remove the cap screw at 5, Figure 9-35, from each end, followed by outer hub, 6. The middle roll can now be removed.

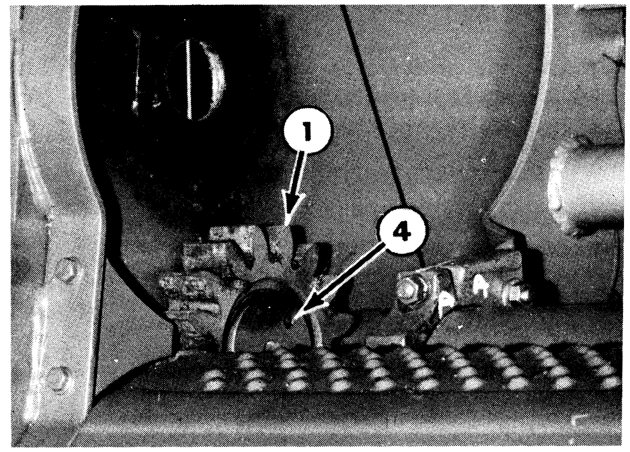


Figure 9-34

1358-6

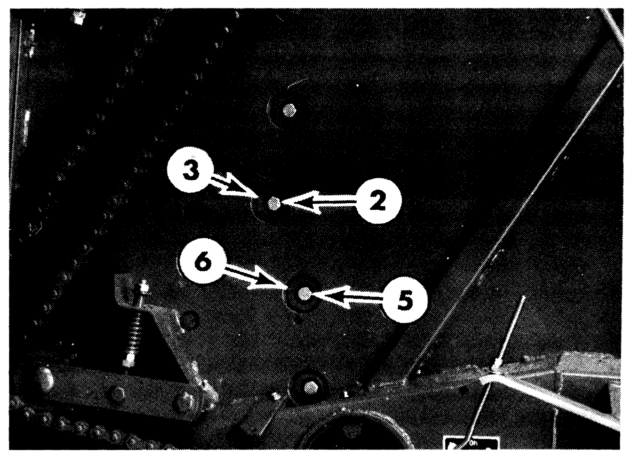


Figure 9-35

1058-6

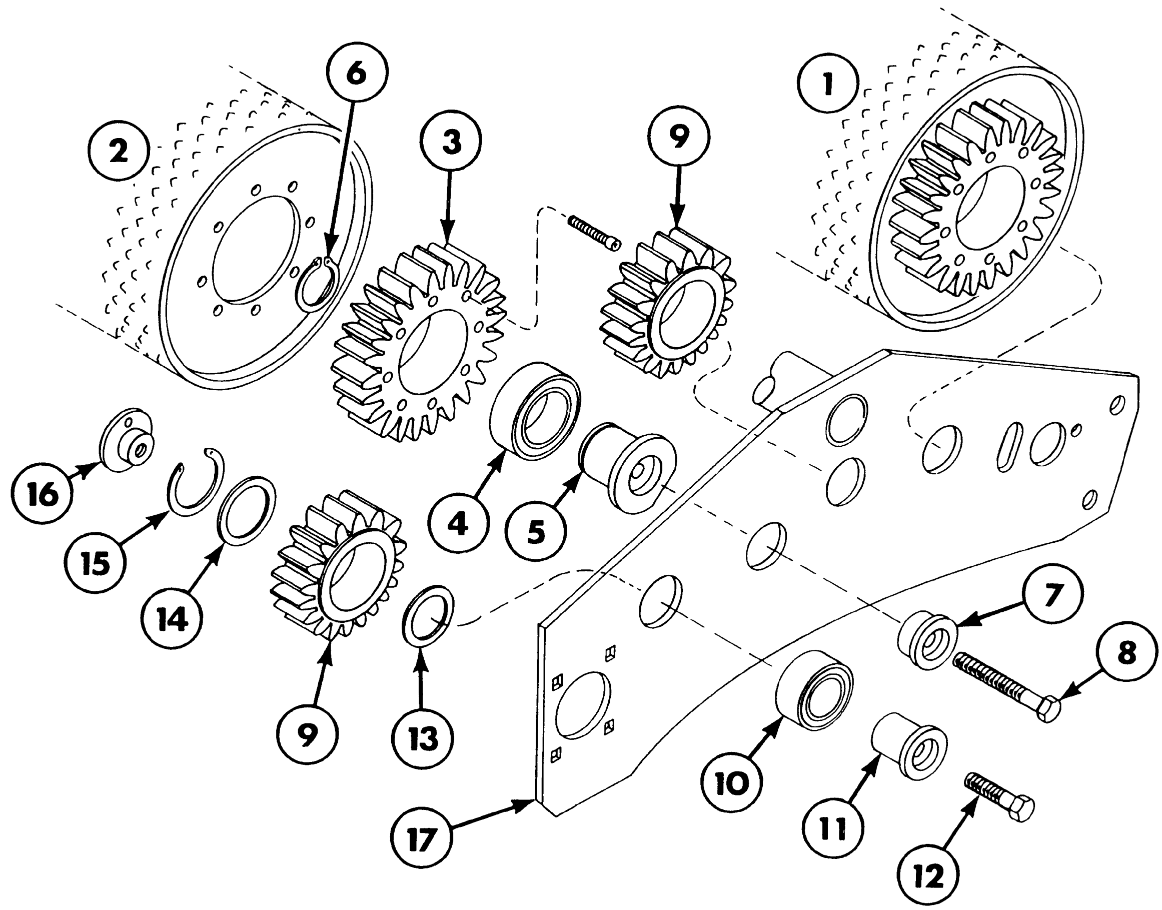


Figure 9-36

INSPECTION

Figure 9-36 shows the components which make up the sledge roll, excluding the pivot roll.

1 Stripper roll
2 Middle roll
3 Gear, 24T
4 Bearing (select fit)
5 Support hub
6 Retaining ring
7 Hub
8 Cap screw, M12 x 45
9 Idler gear, 17T
10 Bearing
11 Bearing mount
12 Cap screw, M12 x 30
13 Washer
14 Washer
15 Retaining ring
16 End cap
17 Sledge frame

STRIPPER ROLL AND MIDDLE ROLL

Drive End

Inspect gear, 3, for excessive wear. If replacement is required for best wear life, a complete set of gears and idlers is recommended.

To inspect the bearing properly, the gear, bearing, and support hub must be removed. Remove the socket head screws at 18. With the gear assembly off, remove retaining ring, 6, Figure 9-36, from the back of support hub, 5. Drive out the support hub. The bearing, 4, Figure 9-36, can be rotated 90° in the gear housing and removed. Inspect the bearing for signs of seal deterioration and rough rotation. If either are found, the bearing should be replaced.

NOTE: The gear and bearing are select-fitted at the factory to operate in a range of 84 in. lbs. - 444 in. lbs. (10 N·m - 50 N·m). If the replacement bearing is too tight, a harsh popping sound will be heard during bale formation when it becomes necessary for the bearing to pivot in the gear.

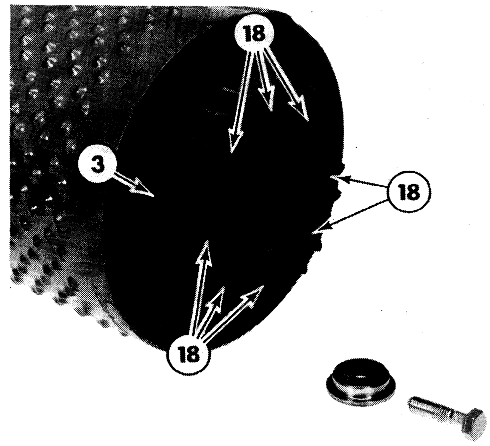
To check the fit between the bearing or gear, secure the gear in a bench vise. Using a bar equal to the inner race size, with a spring scale, measure the force needed to break away or cause the bearing to pivot.

Example: 12″ bar with a pull of 36 lbs. on a spring scale equals a breakaway force of 432 in. lbs.

12″ bar x 36 lbs. = 432 in. lbs.

NOTE: Before checking the breakaway torque, the bearing should be swiveled once around the housing.

Reassemble the bearing, gear, and support hub assembly to the roll. Torque the socket-head cap screws to 150 in. lbs. - 160 in. lbs. (16.8 N·m - 18 N·m).



1358-5

Figure 9-37

Idler End

Inspect the idler roll bearing for rough rotation and signs of seal failure. If either are found, the bearing should be replaced. To replace, pivot the bearing 90° to the housing and withdraw through the slots at 1.

NOTE: The bearing is select-fitted at the factory to operate in a range of 53 in. lbs. - 354 in. lbs. (6 N·m - 40 N·m).

If replacement of the bearing is required, check the breakout force of the new bearing in the same manner as described previously. If a new housing is required, the bearing and housing are already fitted. Torque the housing to roll cap screws at 19, to 41 ft. lbs. (56 N·m). Use antiseize lubricant on the shaft surface of the support hub at 20.

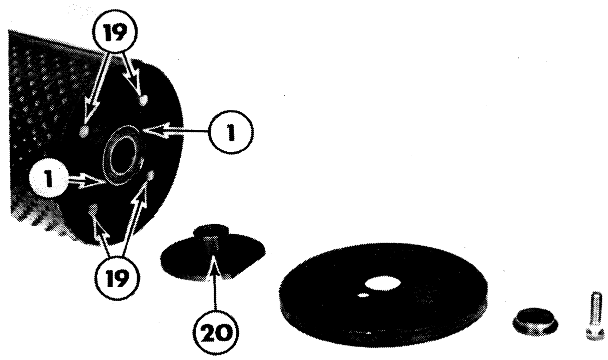


Figure 9-38

1358-11

INTERMEDIATE IDLER GEAR

Inspect the idler gear and bearing for rough areas and replace if questionable. Apply antiseize lubricant to all mating surfaces during assembly.

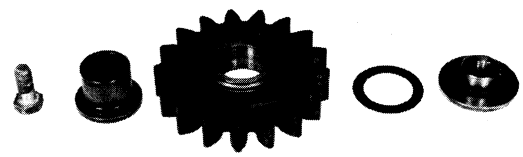


Figure 9-39

1358-9

ASSEMBLY

Install the roll assemblies and intermediate idler assembly in the reverse of the disassembly procedure.

Install the roll assemblies so the flat side of support hub, 5, Figure 9-40, is aligned with the welded stop on the sledge frame shown in Figure 9-41.

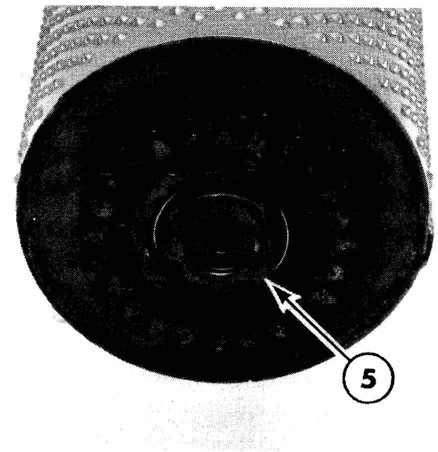


Figure 9-40

2048-3

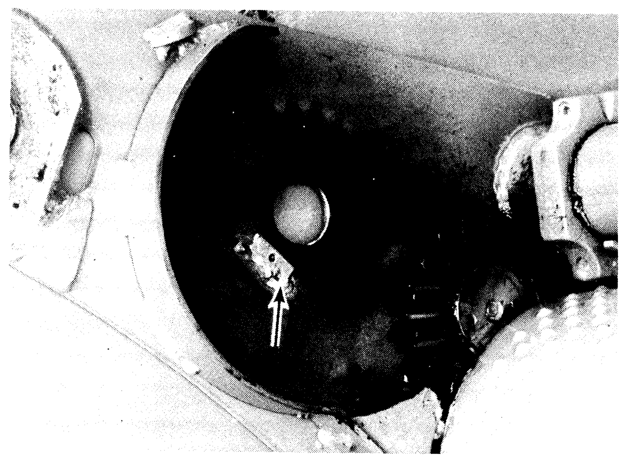


Figure 9-41

2048-8

NOTE: When installing the roll assemblies, be sure the welded seam of each roll does NOT overlap the welded seam of the adjoining roll.

Apply 242 Loctite or similar thread locker material to the M12 cap screws, securing the rolls to the sledge frame. Torque the cap screws to 72 ft. lbs. - 76 ft. lbs. (97 N·m - 103 N·m).

Release the securing device from the sledge roll assembly. Reapply belt tension and lower the tailgate.

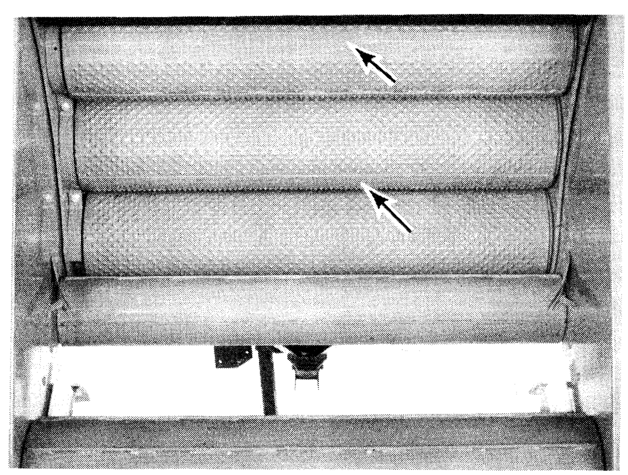


Figure 9-42

A4398-13

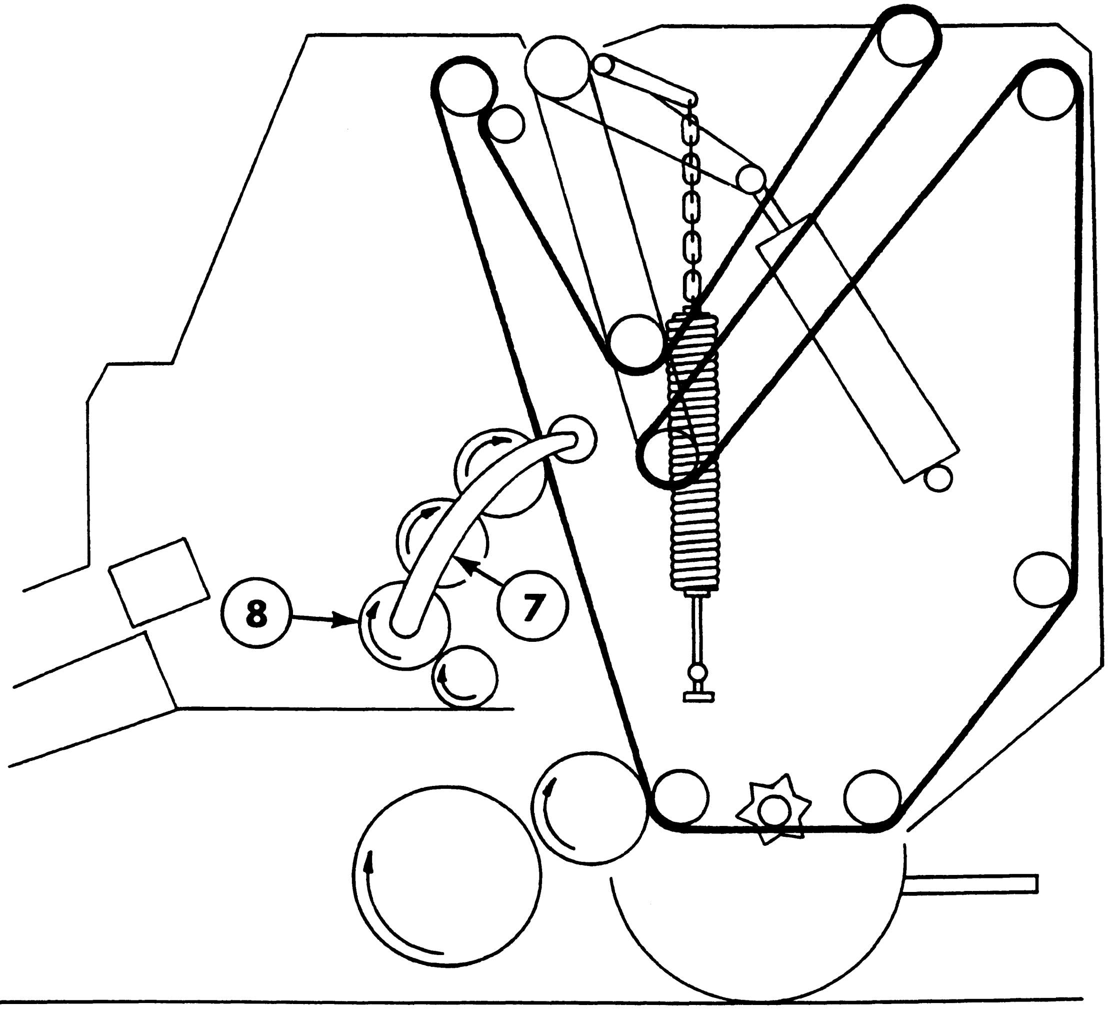


Figure 9-43

PIVOT ROLL AND SLEDGE ASSEMBLY

The pivot roll, 8, Figure 9-43, is the fixed dimple roll which the sledge assembly, 7, pivots around. On the Model 634, it is necessary to remove the pivot roll to gain access to the stripper roll. On the larger models, if the complete drive gear assembly requires rebuilding, removal of the sledge assembly will ease removal and installation if appropriate lifting devices are available.

Following is the procedure for removing the pivot roll and sledge assembly. Only disassemble the unit as far as needed to make the necessary repair.

MODEL 634

1. Remove pivot roll drive chain, 1, and stripper roll drive chain, 2.
2. Remove stripper roll drive sprocket, 3. Remove idler bracket, 4.

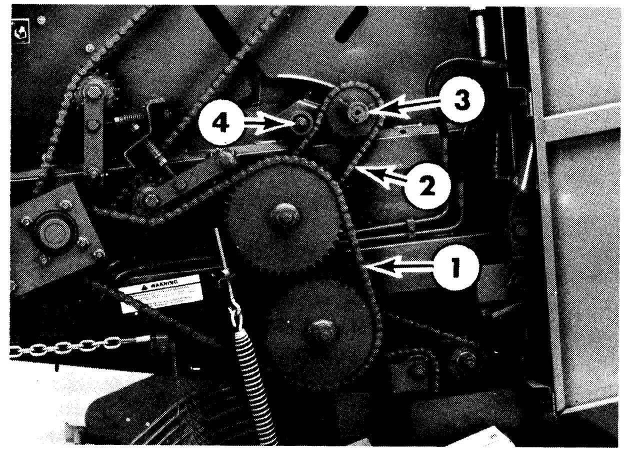


Figure 9-44

1461-8

3. Remove the tension from the apron belts by opening the tailgate, removing the stored bolt at 1, Figure 9-45, and installing it as shown at 2, Figure 9-46. Close the tailgate.

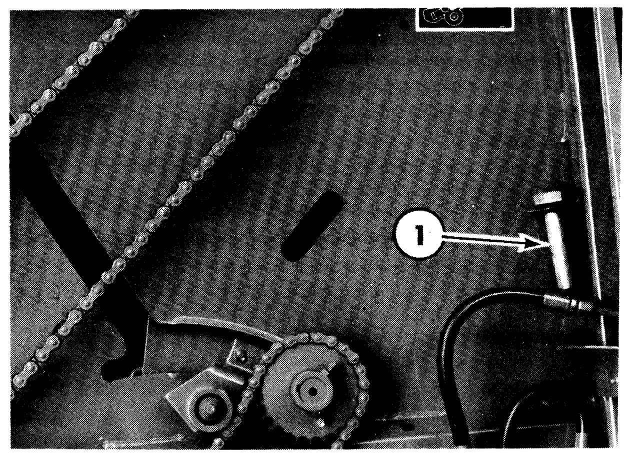


Figure 9-45

9223-8

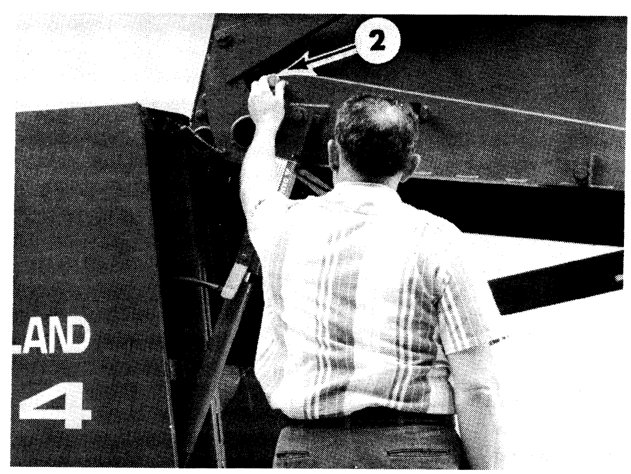


Figure 9-46

A4116-15

Remove the apron belts, 1, Figure 9-47. Remove both the left and right side shields, 2. Remove the twine box, 3.

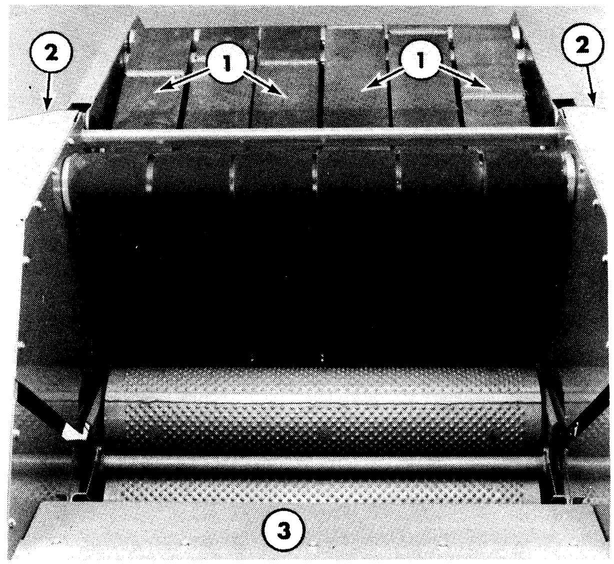


Figure 9-47

9223-8

4. Remove limit chains, 1, by removing cap screws, 2.

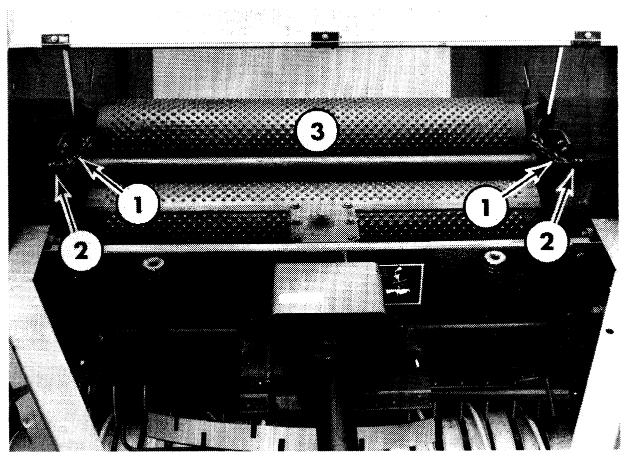


Figure 9-48

9813-12

5. Remove cap screw, 1, holding sprocket, 2, to the fixed pivot roll.

   NOTE: A puller may be needed to remove sprocket, 2.

6. Support the sledge frame assembly, 3, Figure 9-48.

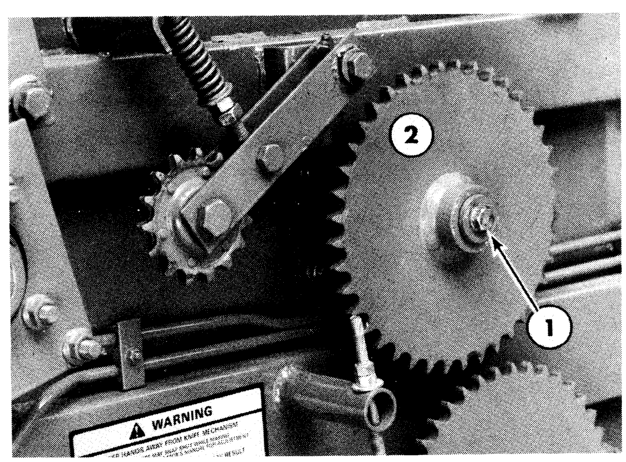


Figure 9-49

9813-6

Remove the four nuts, 1, retaining cover plate assembly, 2. Remove the cover plate, flangettes, and bearing as an assembly.

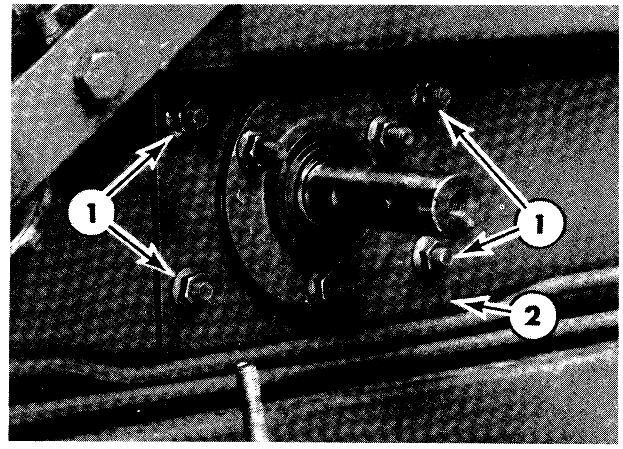


Figure 9-50

9813-7

7. Remove shims, 1, and spacer, 2. The three bolts, 3, retaining the sledge frame to the fixed pivot roll can now be removed.

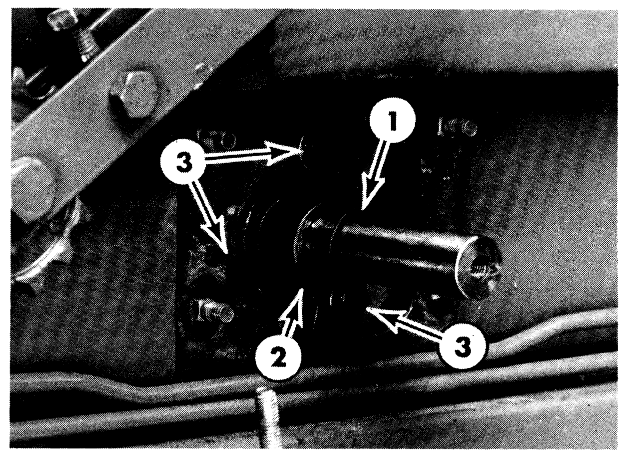


Figure 9-51

9813-8

8. On the right side of the baler, remove lock collar, 1. Remove the four bolts, 2, retaining the cover plate, and remove the cover plate flangettes and bearing as an assembly.

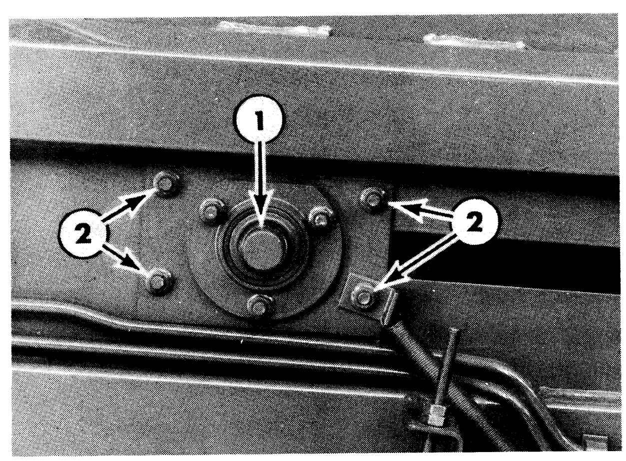


Figure 9-52

1020-6

9. Remove the three bolts, 1, retaining the sledge frame to the fixed roll.

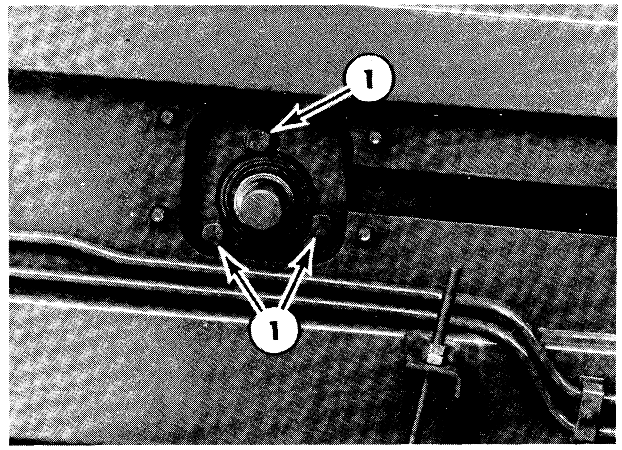


Figure 9-53

1020-5

10. The sledge frame, stripper roll, and follower roll can now be removed as an assembly, as shown.

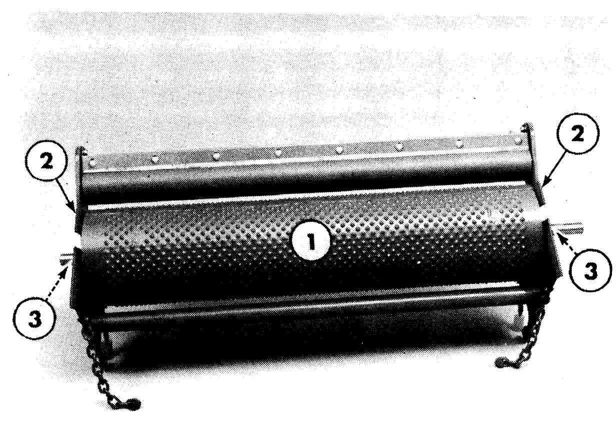


Figure 9-54

9813-4

11. Remove lock collar, 1, on each side of the stripper roll. Remove the three M10 x 30 cap screws and washers, 2, on each side of the sledge frame assembly that retain the bearings to the sledge frame. Roll, 1, Figure 9-54, can now be removed from the sledge frame.

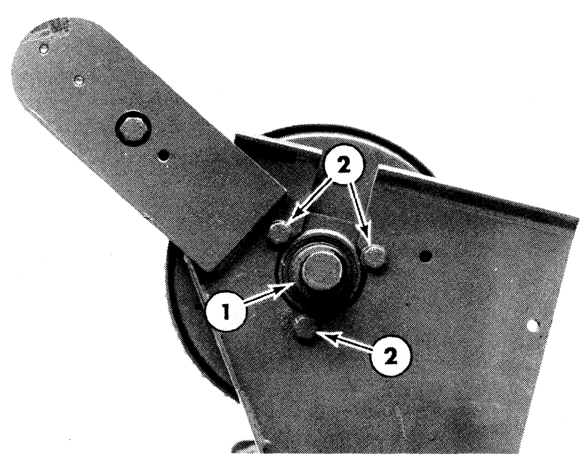


Figure 9-55

1021-10

12. Bearing, 1, and plate, 2, can now be removed from stripper roll assembly, 3.

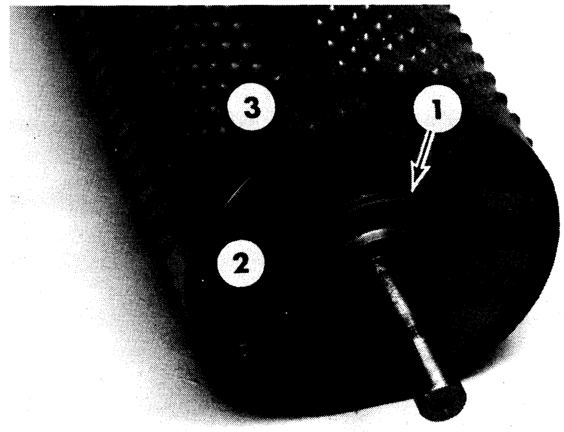


Figure 9-56

9812-5

Pivot Roll Removal

13. Remove bearing and flangettes, 1, from the right side of pivot roll, 2.

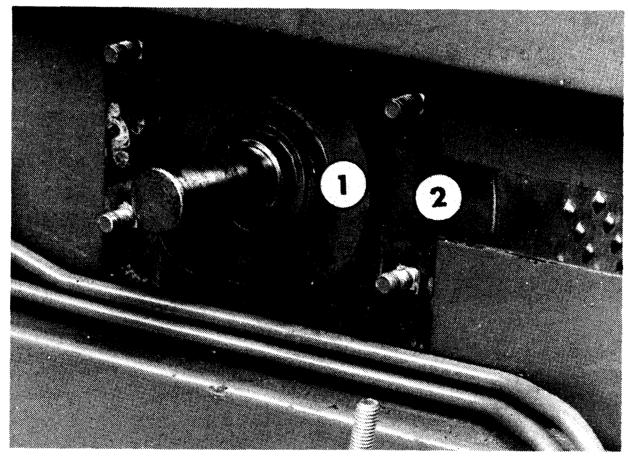


Figure 9-57

9812-11

14. Use a hoist to support the fixed roll and slide the roll forward in the slot on the right side of the main frame, as shown. This will allow the shaft to pull out of the left side of the main frame and then the roll can be removed from the baler.

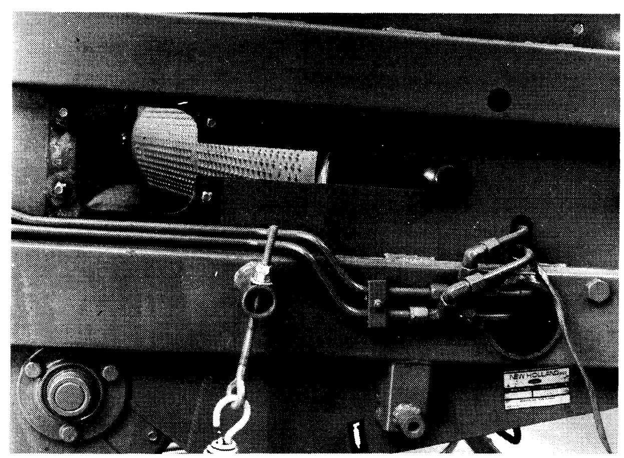


Figure 9-58

9812-6

15. Figure 9-59 shows the parts for the sledge frame assembly displayed.

    NOTE: The instructions for removing and installing follower roll, 1, are in the first part of this section.

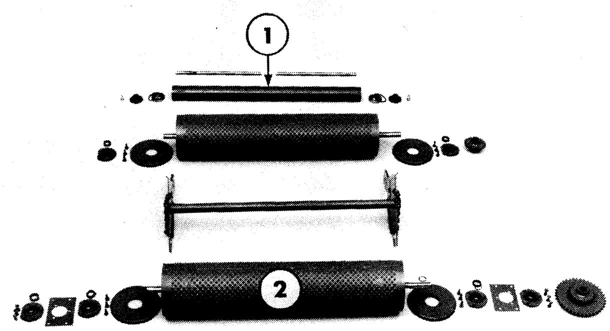


Figure 9-59

9812-8

PIVOT AND STRIPPER ROLL INSTALLATION

1. Assemble the bearings and shields on the stripper roll. Install the roll in sledge frame, 1. Use a longer M10 bolt and drift punch at 2, to assist in pulling shield, 3, and bearing flange, 4, against main frame, 1. Install a bolt at 5, and in place of the drift punch. Tighten these two bolts to 38 ft. lbs. (52 N·m). Remove the longer bolt and leave this bolt out, as an idler bracket will be bolted on after the sledge frame is installed in the baler.

   NOTE: Be sure to position end shield, 3, with the screw exposed in the slot. The purpose of the screw is to be able to rotate the shield to align the holes for the bolts.

2. Assemble the other side in a similar manner, but install and torque all three cap screws.

3. Center roll, 1, Figure 9-54, between sledge frame assembly, 2. Tighten the lock collars at 3.

4. Assemble the pivot roll, 2, Figure 9-59, and install it back in the baler.

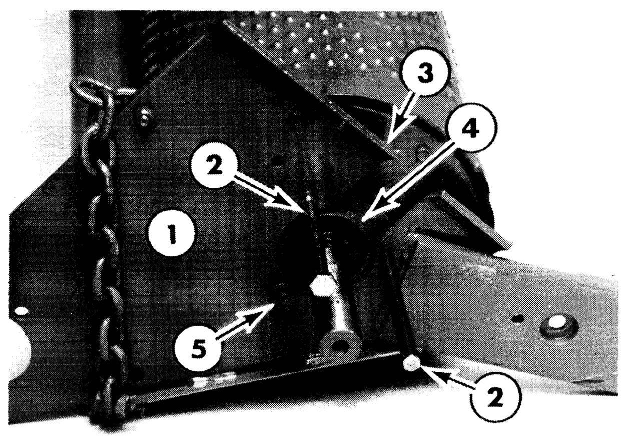


Figure 9-60

9812-12

5. Install the sledge frame assembly in the baler. Use a longer M10 bolt at 1, and a drift punch at 2, to line up the frame with the bearing flangettes and shield on the roll. The cap screw and washer, 3, can now be installed. Remove drift punch, 2, and install a cap screw and washer. Torque the cap screws at 2 and 3 to 38 ft. lbs. (52 N·m).

   Remove the long bolt. Install the remaining cap screw and washer and torque it to 38 ft. lbs. (52 N·m).

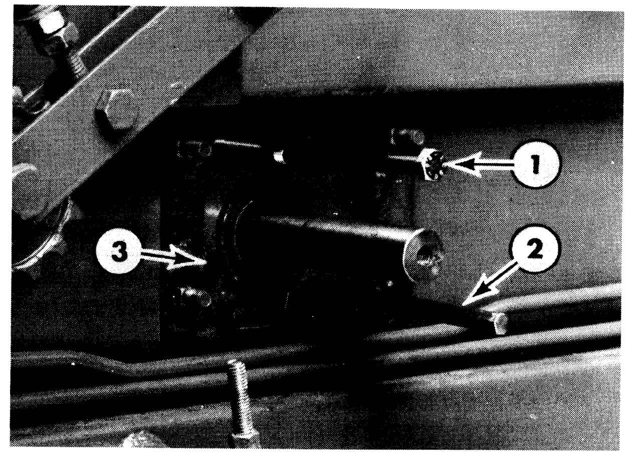


Figure 9-61

9813-1

6. Attach the right side in a similar manner. While supporting the sledge frame and fixed roll, install bearing and cover plate assembly, 1.

   NOTE: Do not install the lock collar or tighten the hardware at this time.

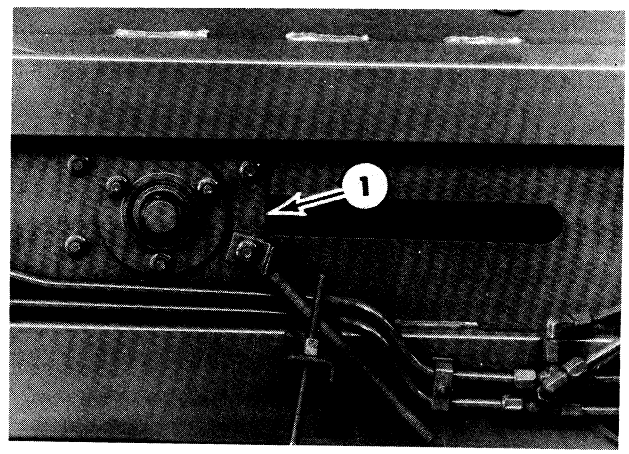


Figure 9-62

1020-6

7. On the left side, assemble the collar and shims on the shaft that were removed during disassembly. Install cover plate and bearing assembly, 1, and tighten all hardware on the left side.

   NOTE: The wide position of the inner race must face the center of the roll. Install any shims removed during disassembly next to the outer bearing at 2.

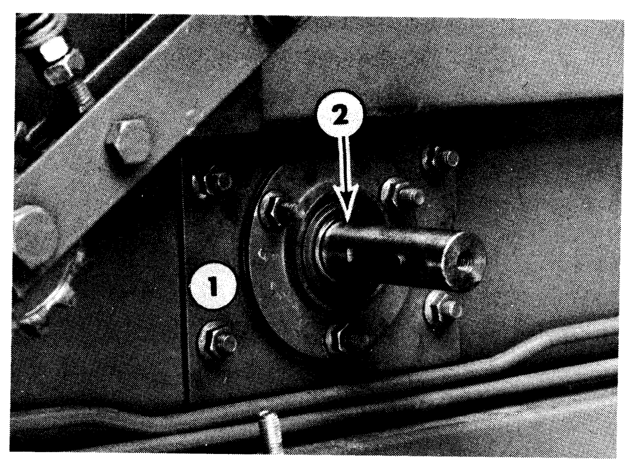


Figure 9-63

9813-7

8. Install key and sprocket, 1. Install and tighten the cap screw and washers at 2.
9. Rotate the pivot roll and make sure the roll does not rub the sledge frame at any point. If rubbing occurs, remove or add shims between the two left bearings at 1, Figure 9-51.

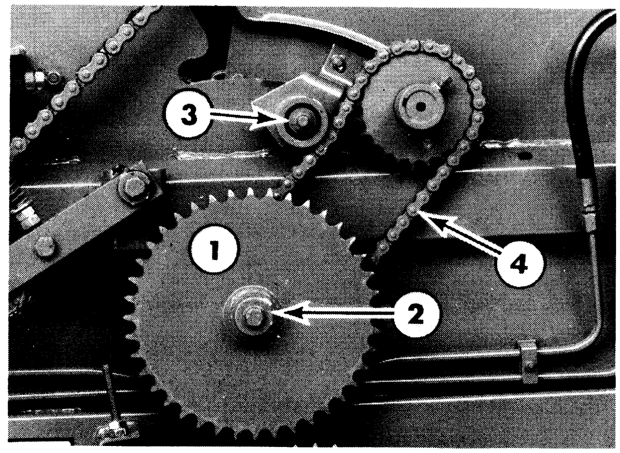


Figure 9-64

1020-10

10. With the left side tight, support the sledge frame and remove the cover plate and bearing assembly on the right side, 1. Install and tighten the lock collar on the inner fixed pivot roll bearing. Install the cover plate and bearing assembly and tighten the hardware at 1. Install and tighten lock collar, 2.
11. Install idler bracket, 3, Figure 9-64, and fixed pivot roll drive chain, 4.

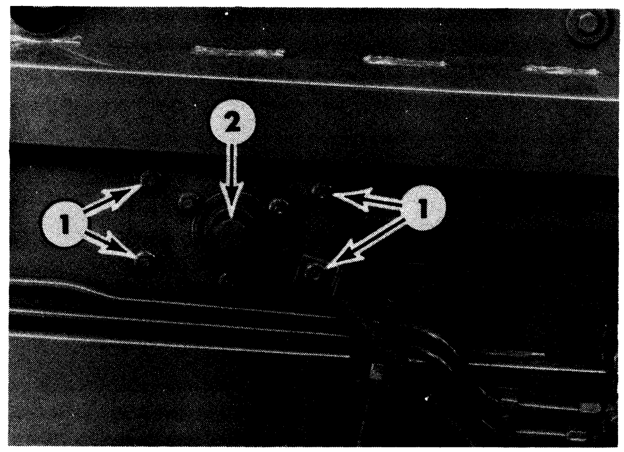


Figure 9-65

1020-6

12. Check the sprocket alignment and install and adjust the remaining drive chains as shown. The shields and apron belts can now be installed.
13. Open the tailgate and remove the bolt at 2, Figure 9-46. Replace the bolt in the storage location and close the tailgate.

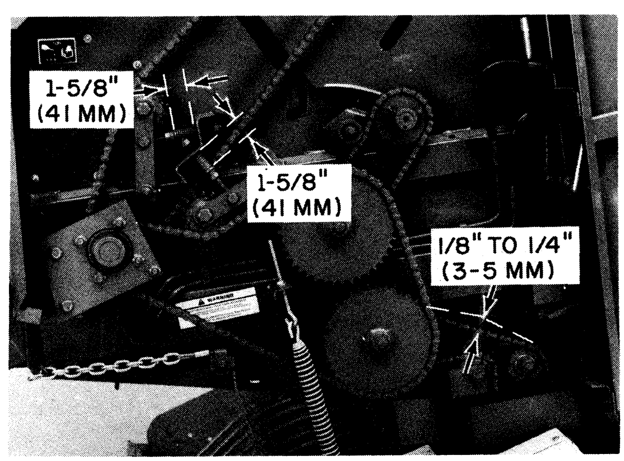


Figure 9-66

1461-8

MODELS 644, 654, AND 664 PIVOT ROLL REMOVAL

Before beginning roll removal, release the tension on the belts.

Model 644

To remove belt tension on the Model 644:

Open the tailgate far enough that bolt, 1, Figure 9-67, stored on the left side of the frame can be installed under the spring attaching arm, as shown at 1, Figure 9-68.

Lower the tailgate, the bolt will hold the take-up arm up to remove tension from the belts.

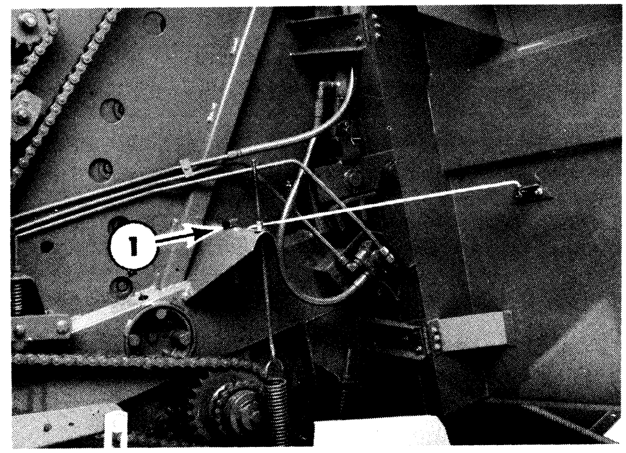


Figure 9-67

1633-12

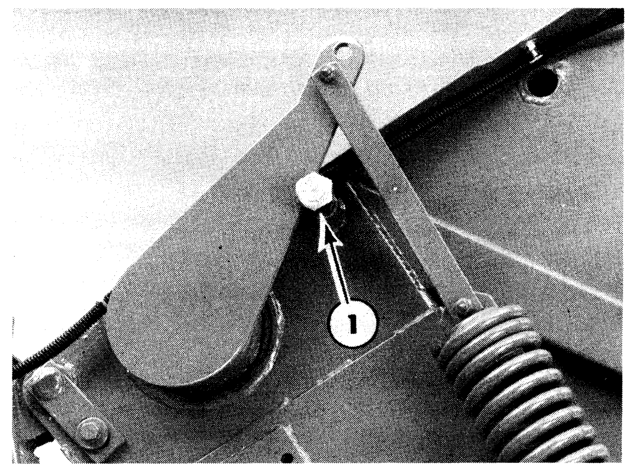


Figure 9-68

A4398-11

Models 654 and 664 System

Open the tailgate far enough that lock pin, 1, can be placed under the take-up arm by moving the handle at 2.

Lower the tailgate, the pin will hold the take-up arm up to remove tension from the belts.

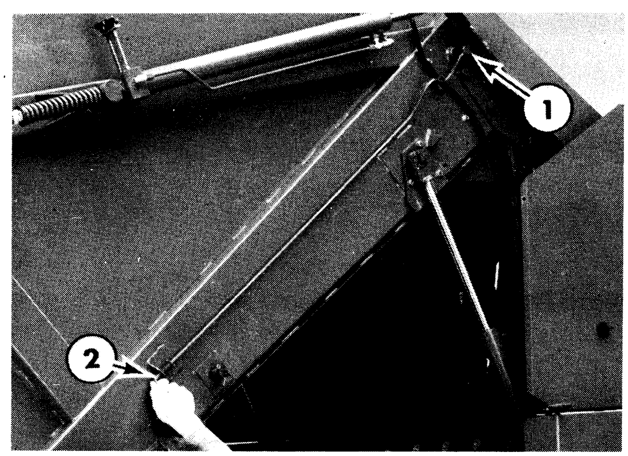


Figure 9-69

2361-11

On the right side of the baler, if equipped with Auto-Wrap, remove the belt and drive sheave, as shown at 1, and also remove the woodruff key and spacer.

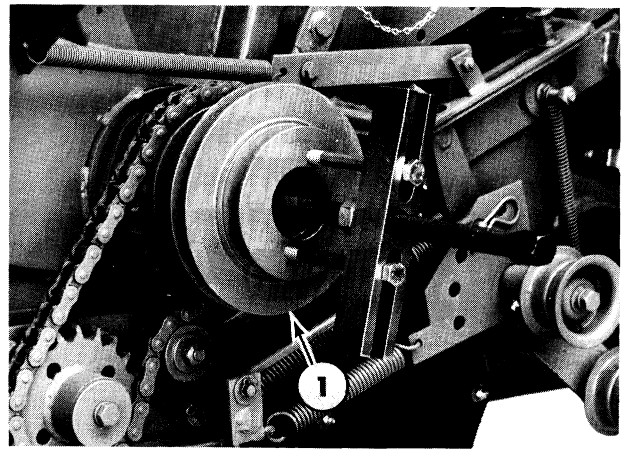


Figure 9-70

1490-3

If equipped with Bale Command, remove the cap screw, washer, and spacer at 1. Also remove the woodruff key and spacer.

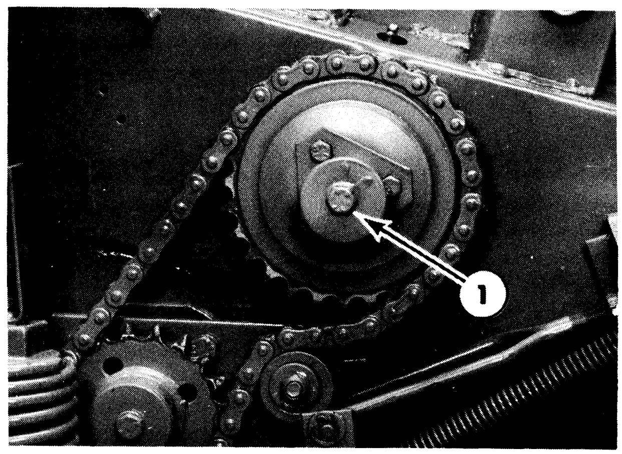


Figure 9-71

1631-1

Remove drive chain, 1, and sledge roll clutch assembly, 2.

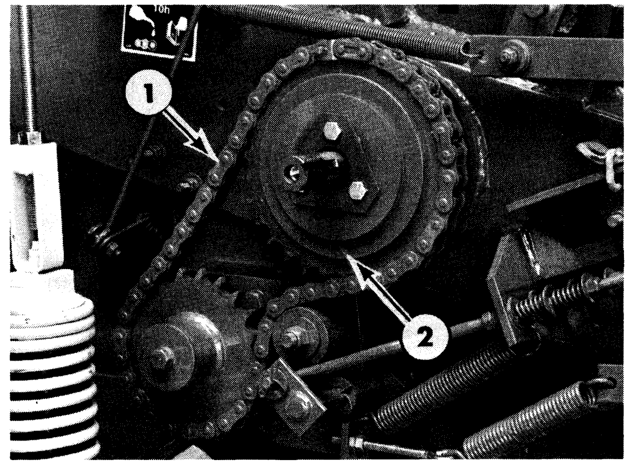


Figure 9-72

A4399-10

Remove the woodruff key, washers, and lock collar from the roll shaft at 1. Remove the four cap screws at 2. Remove the bearing and flangettes at 3.

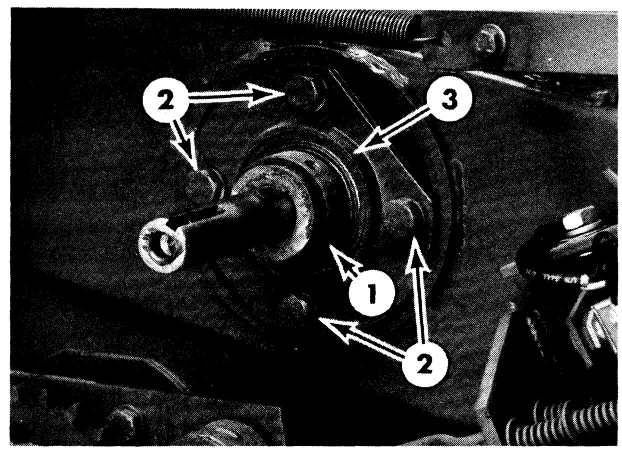


Figure 9-73

1496-4

Remove shield, 1, from each side of the baler below the pivot roll.

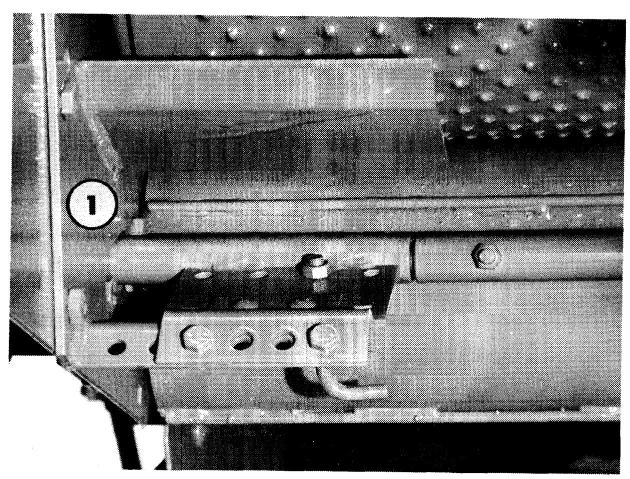


Figure 9-74

A4600-3

On the left side of the baler, remove the cap screw at 1.

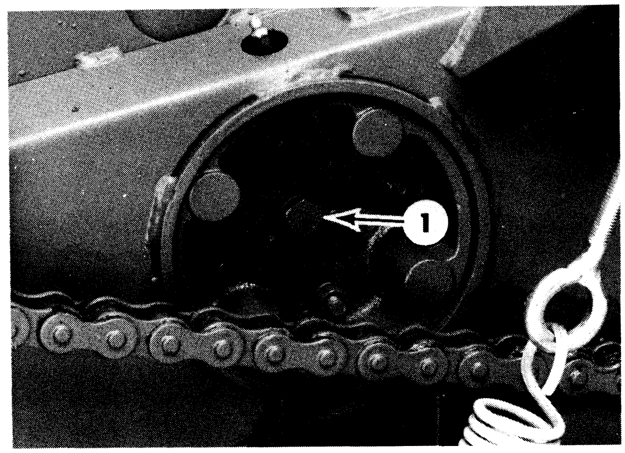


Figure 9-75

1496-9

Working over the pickup with the wind guard removed, disengage the left-hand end from the idler gear by moving the roll upward. After the shaft is free from the frame on the right-hand side, remove the roll from the baler.

NOTE: Removal of the pickup is not mandatory; however, access and handling are greatly improved. The pivot roll for a Model 664 weighs 70 lbs. (32 kg).

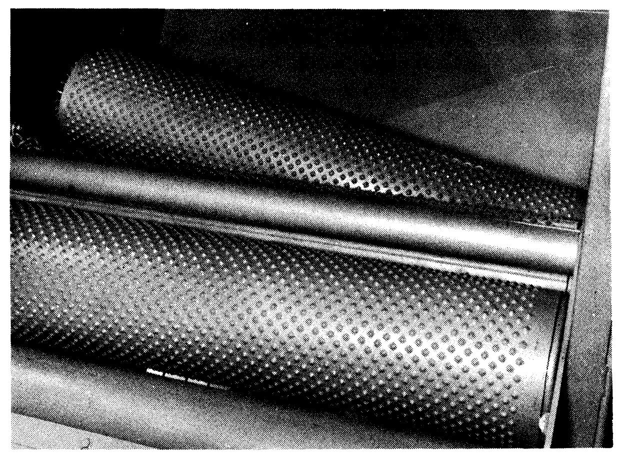


Figure 9-76

1497-4

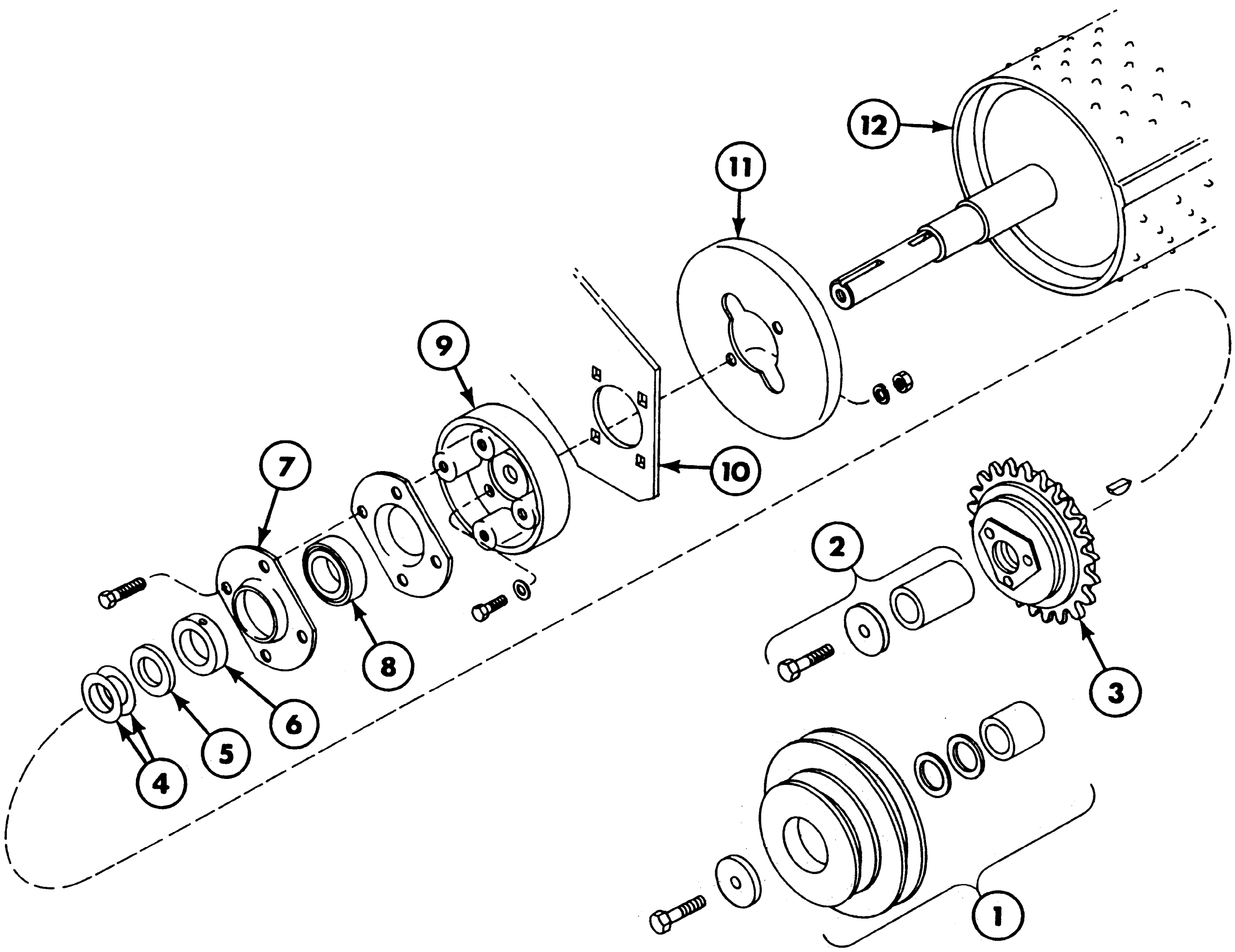


Figure 9-77

INSPECTION

Figures 9-77 and 9-78 show the components which make up the pivot roll assembly.

1 Auto-Wrap group
   Sheave
   M10 x 40 cap screw
   Washer
   Spacer

2 Bale Command group
   M10 x 40 cap screw
   Washer
   Spacer

3 Sledge roll clutch
4 Washers
5 Spacer
6 Lock collar
7 Flangette
8 Bearing
9 Pivot hub
10 Sledge frame
11 Dust shield
12 Pivot roll

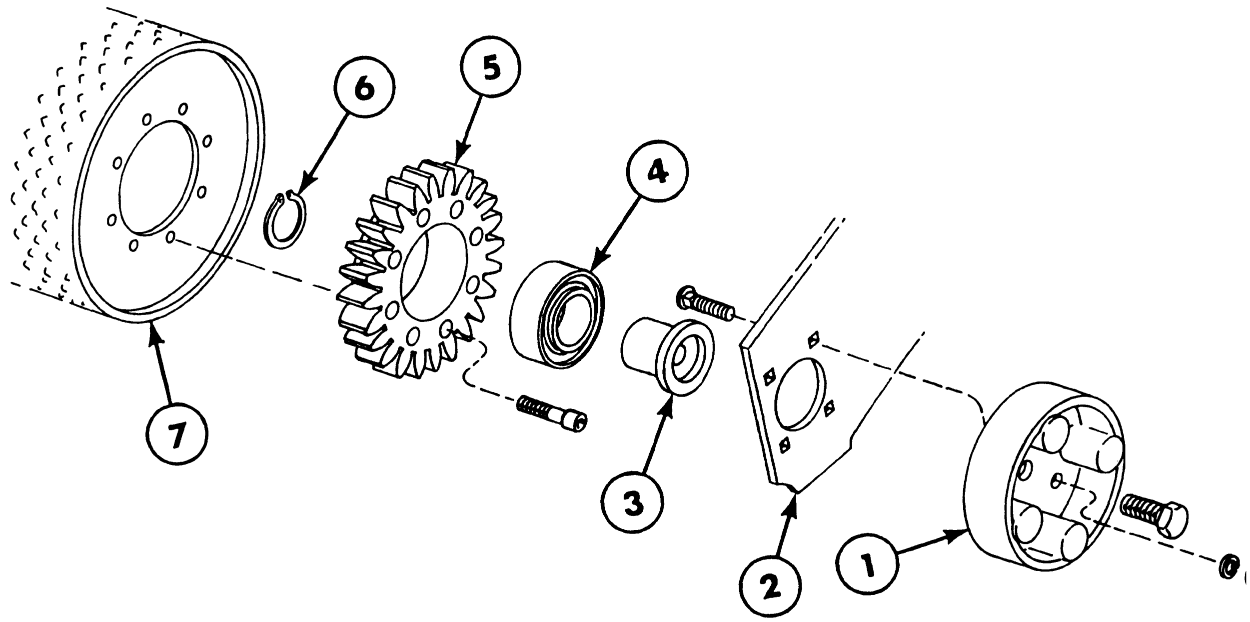


Figure 9-78

Pivot Roll - LH Side

1 Pivot hub
2 Sledge roll frame
3 Bearing support hub
4 Bearing
5 Roll gear, 24T
6 Retaining ring
7 Pivot roll

Inspect gear, 5, Figure 9-78, for excessive wear. If replacement is required, a complete set of gears and idlers is recommended.

To inspect the bearing properly, the gear bearing and support hub must be removed. Remove the socket-head screws securing the gear to the pivot roll. On the back side, remove retaining ring, 6. Drive out the support hub. The bearing item, 4, can be rotated 90° in the gear housing and removed. Inspect the bearing for signs of seal deterioration and/or rough rotation. If either are found, the bearing should be replaced.

NOTE: The gear and bearing are select-fitted at the factory to operate in a range of 84 in. lbs. - 444 in. lbs. (10 N·m - 50 N·m). If the replacement bearing or gear and bearing assembly are too tight, a harsh popping sound will be heard during bale formation when the bearing is forced to pivot in the gear.

To check the fit between the bearing and a gear, secure the gear in a bench vise. Using a bar equal to the inner race size, with a spring scale, measure the force needed to break away or cause the bearing to pivot.

Example: 12″ bar with a pull of 36 lbs. on a spring scale equals a breakaway force of 432 in. lbs.

12″ bar x 36 lbs. = 432 in. lbs.

NOTE: Before checking the breakaway torque, the bearing should be swiveled around the housing.

Reassemble the bearing, gear, and support hub assembly to the roll. Torque the socket head cap screws to 150 in. lbs. - 160 in. lbs. (16.8 N·m - 18 N·m).

Inspect bearing, 8, Figure 9-77, for rough rotation or seal damage. Replace if required.

INSTALLATION

To install, reverse the order of the removal sequence.

When installing cap screw, 1, apply 242 Loctite or similar thread locker material to the M12 cap screw. Torque to 72 ft. lbs. - 76 ft. lbs. (97 N·m - 103 N·m).

Adjust the sledge roll drive chain idler so the chain has a slight sag 1/8″ - 5/16″ (3 mm - 8 mm).

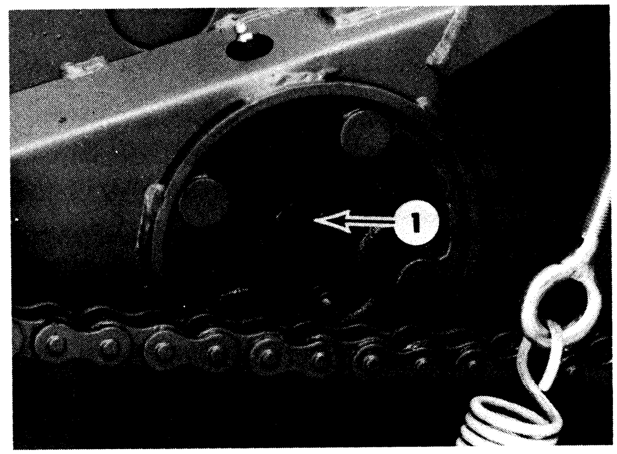


Figure 9-79

1496-9

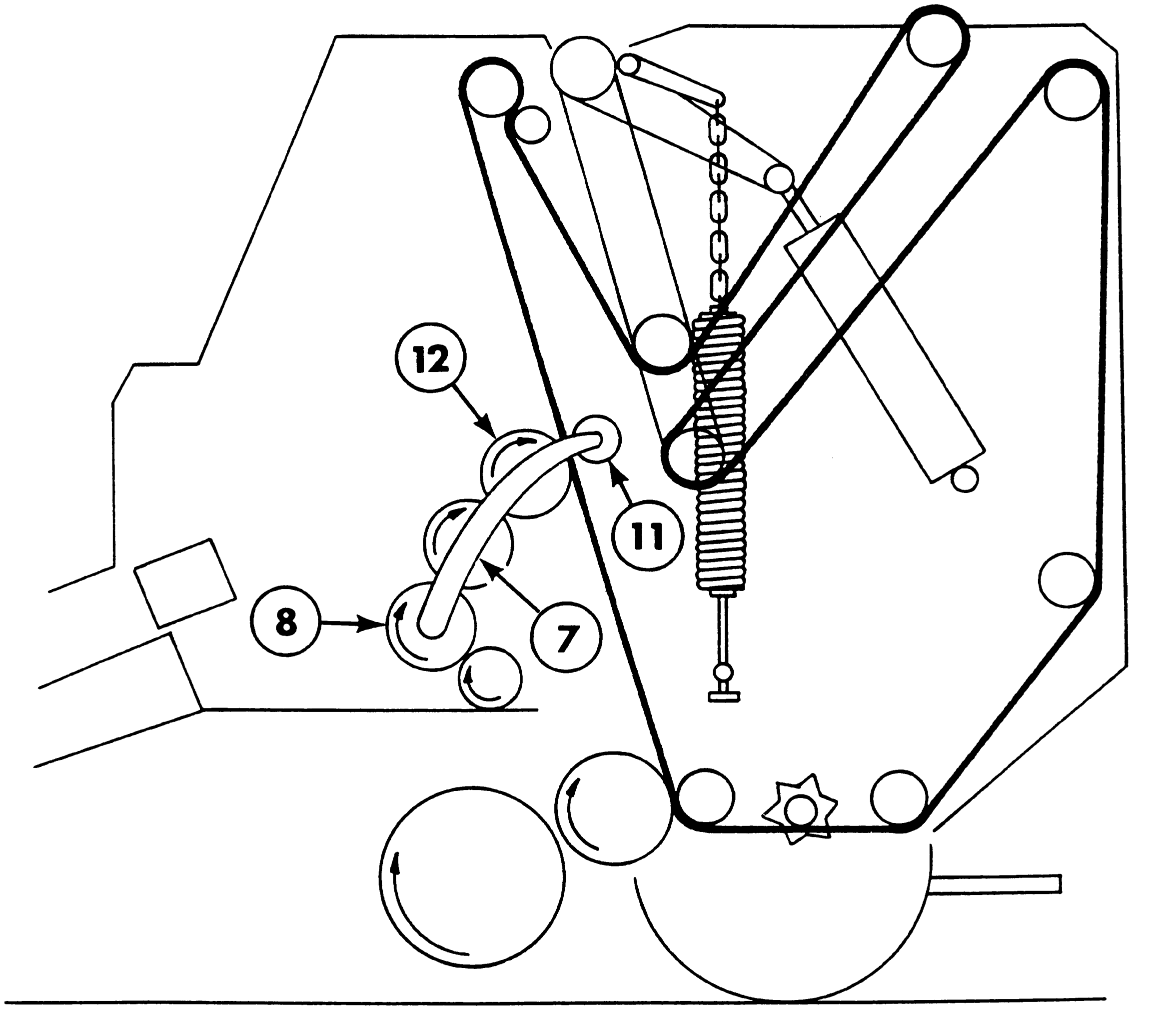


Figure 9-80

SLEDGE ROLL ASSEMBLY REMOVAL

Models 644, 654, and 664

To remove the sledge roll assembly, 7, Figure 9-80, follow the procedure for removal of the pivot roll assembly, 8, previously described in this section.

After removal of the pivot roll, the apron belts must be removed from the follower roll, 11, Figure 9-80. If the baler has laced belts, remove the cable lacer from each belt. Remove the belts from the baler. With either endless belts or laced belts, manually pivot the sledge assembly forward to disconnect the limit chain, 1, Figure 9-81.

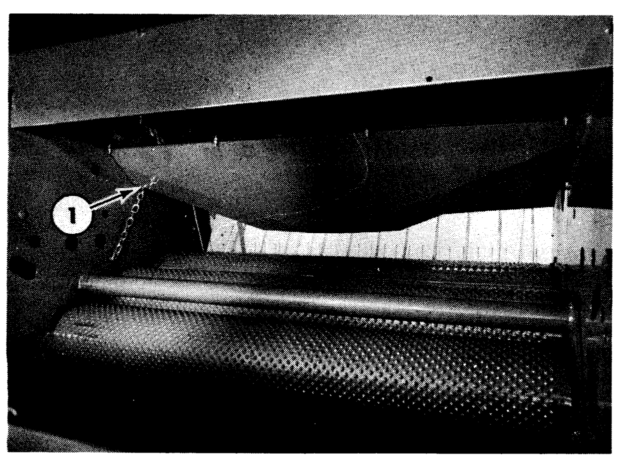


Figure 9-81

With the endless belt-equipped baler, slowly open the tailgate approximately 36″ (91 cm) and place tailgate lockout valve, 1, in the upper, locked position. Remove cap screws, 2, from each end of the roll scraper and remove the scraper assembly.

Remove cap screw, 3, and hubs from each end of the follower roll and remove the roll assembly from the baler.

Release the tailgate lock valve and open the tailgate to full height. Re-engage the tailgate lock valve.

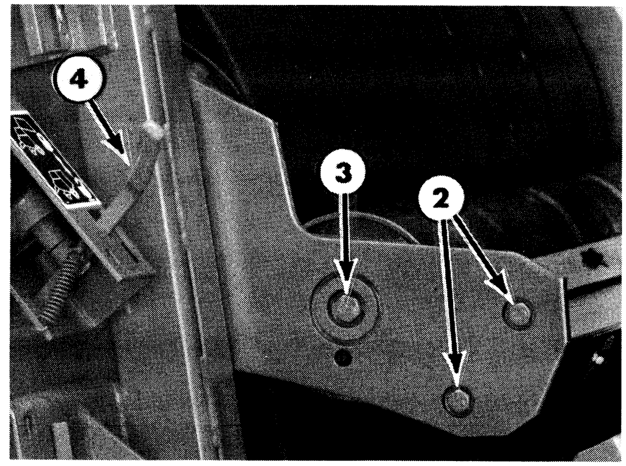


Figure 9-82

A4398-16

Remove the bale ejector and set aside. With a pallet fork or similar portable lifting device, attach the sledge assembly to the lift.

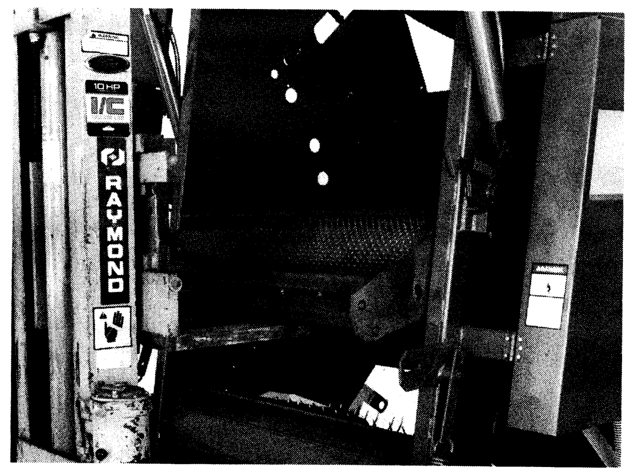


Figure 9-83

1496-2

Remove cap screws, 1, securing the sledge frame to the pivot hubs. Repeat on the opposite side.

The sledge can now be removed from the baler.

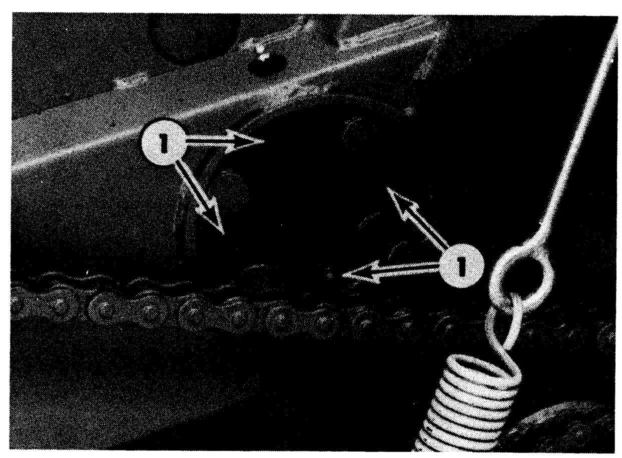


Figure 9-84

1494-9

Figure 9-85 shows the sledge roll assembly, less pivot roll, for the Model 644 silage special.

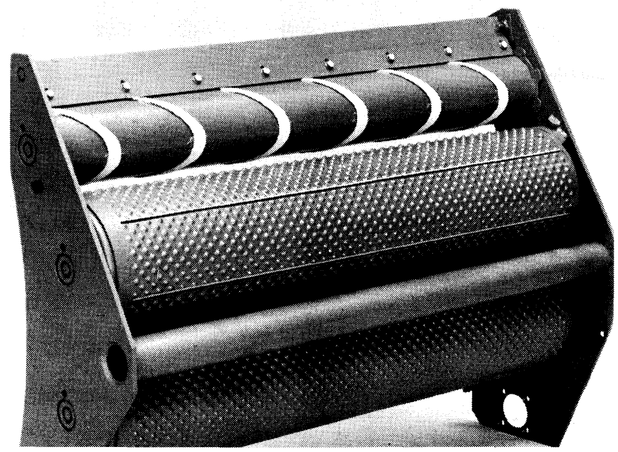


Figure 9-85

2037-9

To remove the middle roll from the sledge frame, remove the cap screw and hub as shown in Figures 9-86 and 9-87.

NOTE: To keep the inner dust shield and support hub from turning when removing the cap screw, use a punch, as shown in Figure 9-86.

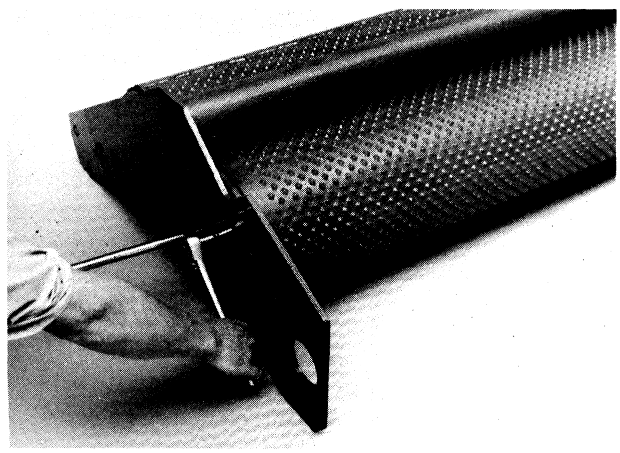


Figure 9-86

1496-6

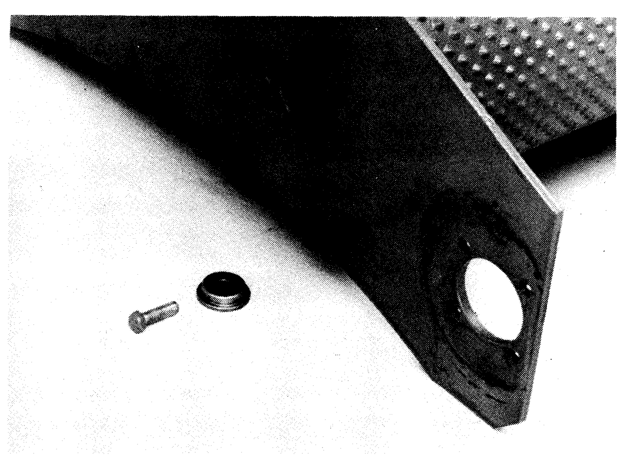


Figure 9-87

1496-5

On the left end of the frame, remove the cap screw at 1, Figure 9-88, to remove the idler assembly. If the inner cap cannot be separated from the bearing mount, install an M16 x 50 or longer cap screw to assist in separating the assembly. See Figure 9-89.

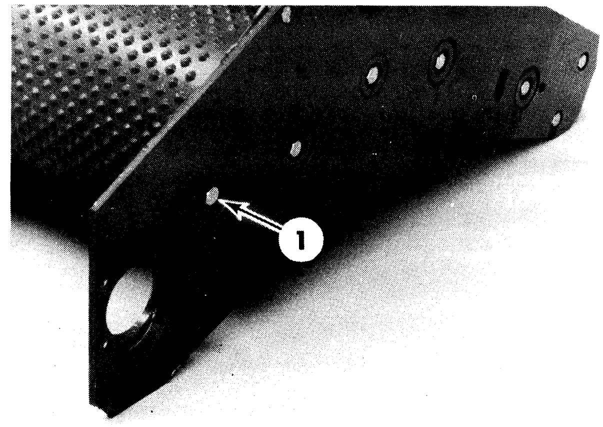


Figure 9-88

1496-11

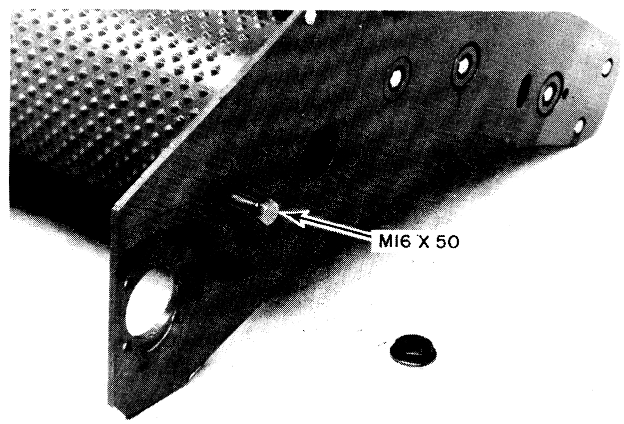


Figure 9-89

1496-10

Remove the M12 cap screw and hub from the left-hand end of the middle roll and remove the roll.

Continue the same procedure to remove the remaining idler and stripper roll assemblies.

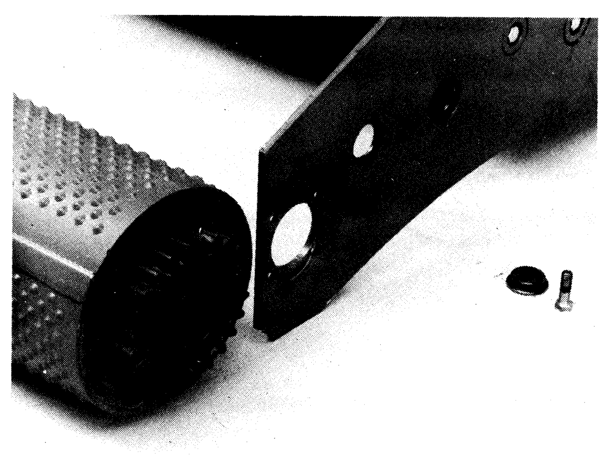


Figure 9-90

1496-9

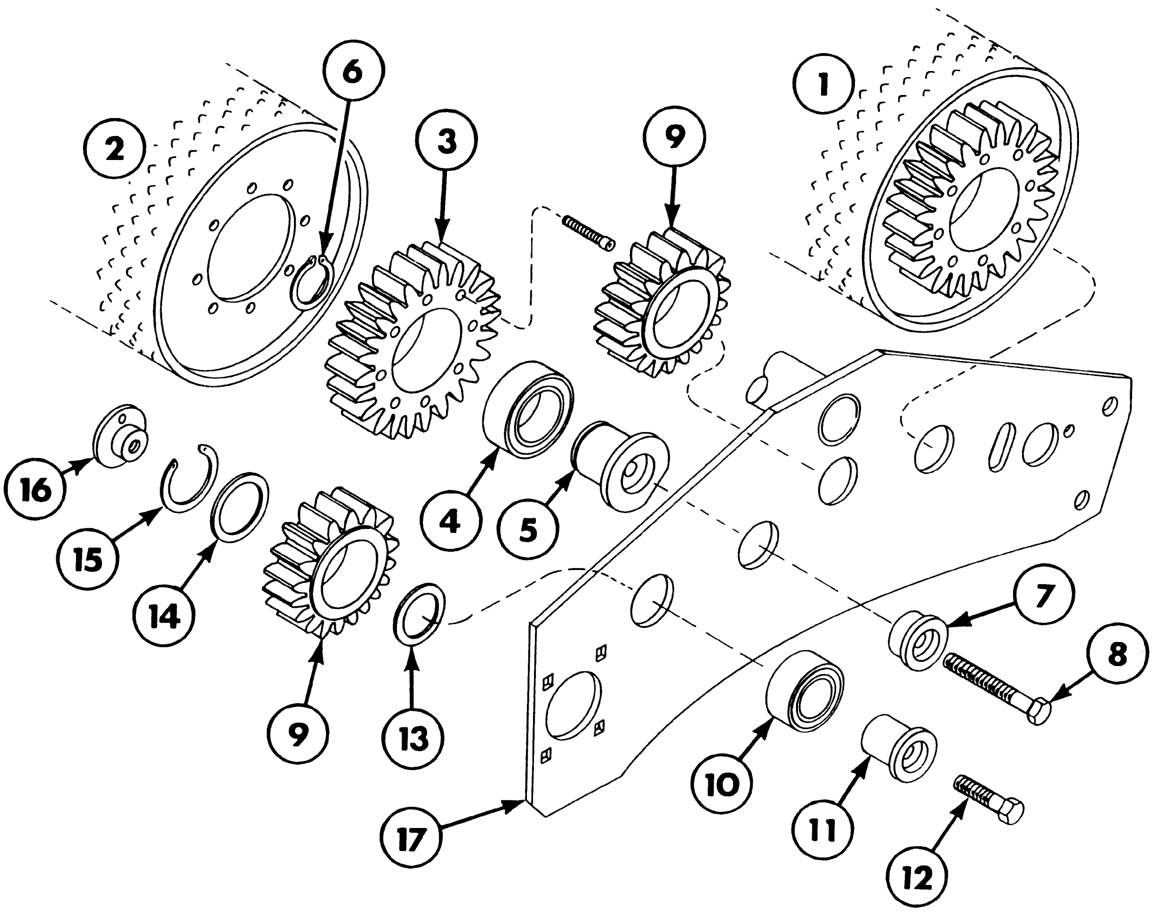


Figure 9-91

INSPECTION

Figures 9-91 and 9-92 show the components which make up the sledge roll assembly, excluding the pivot roll.

1 Stripper roll
2 Middle roll
3 Gear, 24T
4 Bearing, select fit
5 Support hub
6 Retaining ring
7 Hub
8 Cap screw, M12 x 45
9 Idler gear, 17T
10 Bearing
11 Bearing mount
12 Cap screw, M12 x 30
13 Washer
14 Washer
15 Retaining ring
16 End cap
17 Sledge frame

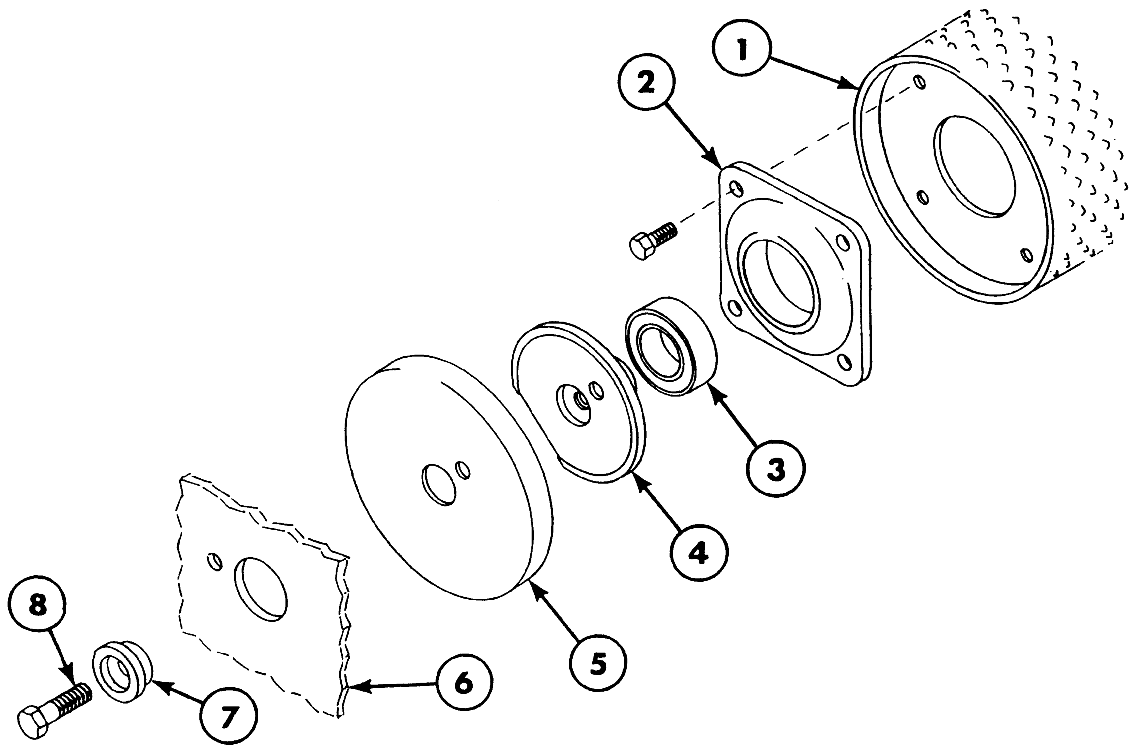


Figure 9-92

1 Stripper or middle roll
2 Bearing housing
3 Bearing
4 Bearing support hub
5 Dust shield
6 Sledge frame
7 Hub
8 Cap screw, M12 x 45

Inspect the rolls and sledge frame and replace if required.

Gears and Bearings

Check the gear, Figure 9-91, for excessive wear. If replacement is required, for best wear life, a complete set of gears and idler is recommended.

To inspect the bearing properly, the gear, bearing, and support hub must be removed. Remove the socket head screws at 18,

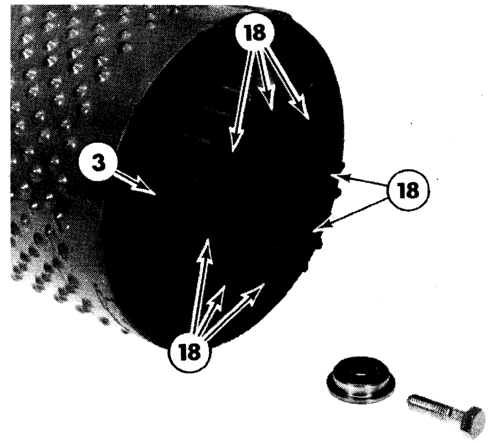


Figure 9-93

1358-5

Figure 9-93 - with the gear assembly off, remove retaining ring, 6, Figure 9-91, from the back of support hub, 5. Drive out the support hub. The bearing, 4, Figure 9-91, can be rotated 90° in the gear housing and removed. Inspect the bearing for signs of seal deterioration and rough rotation. If either are found, the bearing should be replaced.

NOTE: The gear and bearing are select-fitted at the factory to operate in a range of 84 in. lbs. - 444 in. lbs. (10 N·m - 50 N·m). If the replacement bearing is too tight, a harsh popping sound will be heard during bale formation when it become necessary for the bearing to pivot in the gear.

To check the fit between the bearing and gear, secure the gear in a bench vise. Using a bar equal to the inner race size, with a spring scale, measure the force needed to break away or cause the bearing to pivot.

Example: 12″ bar with a pull of 36 lbs. of a spring scale equals a breakaway force of 432 in. lbs.

12″ bar x 36 lbs. = 432 in. lbs.

NOTE: Before checking the breakaway torque, the bearing should be swiveled once around the housing.

Reassemble the bearing, gear, and support hub assembly to the roll. Torque the socket head cap screws to 149 in. lbs. - 160 in. lbs. (16.8 N·m - 18 N·m).

Idler Roll Bearing

Inspect the idler roll bearing for rough rotation and signs of seal failure. If either are found, the bearing should be replaced. To replace, pivot the bearing 90° to the housing and withdraw through the slots at 1.

NOTE: The bearing is select-fitted at the factory to operate in a range of 53 in. lbs. -354 in. lbs. (6 N·m - 40 N·m).

If replacement of the bearing is required, check the breakout force of the new bearing, in the same manner as described previously. If a new housing is required, the bearing and housing are already fitted. Torque the housing to roll cap screws at 19, Figure 9-38, to 41 ft. lbs. (56 N·m). Use antiseize lubricant on the shaft surface of the support hub at 20, Figure 9-94.

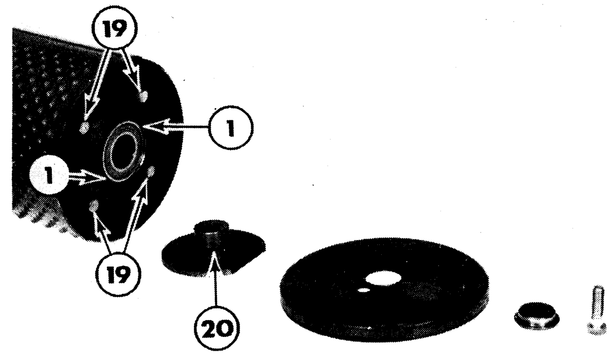


Figure 9-94

1358-11

Intermediate Idler Gear

Inspect the idler gear and bearing for rough areas and replace if questionable. Apply antiseize lubricants to all mating surfaces during assembly.

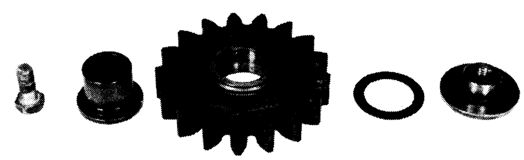


Figure 9-95

1358-9

Assembly

Install the roll assemblies and intermediate idler assembly in the reverse order of the disassembly procedure.

Install the roll assemblies so that the flat side of support hub, 5, Figure 9-96, is aligned with the welded stop on the sledge frame, 1, Figure 9-97.

NOTE: When installing the roll assemblies, be sure that the welded seam of each roll does NOT overlap the welded seam or rod of the adjoining roll.

Apply 242 Loctite or similar thread locker material to the M12 cap screws securing the rolls to the sledge frame. Torque the cap screws to 72 ft. lbs. -76 ft. lbs. (97 N·m -103 N·m).

Lubricate all gears with non-soap grease for initial break-in.

For normal operation, they run dry.

Installation

Replace the sledge roll assembly in the reverse order of the removal sequence.

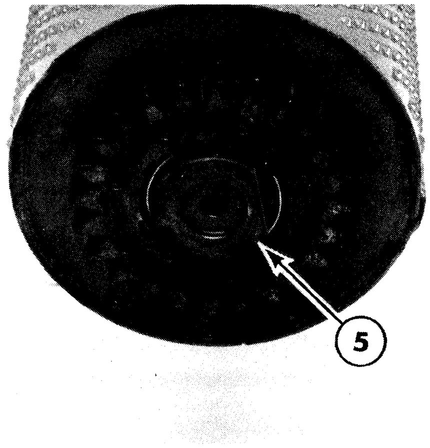


Figure 9-96

2048-3

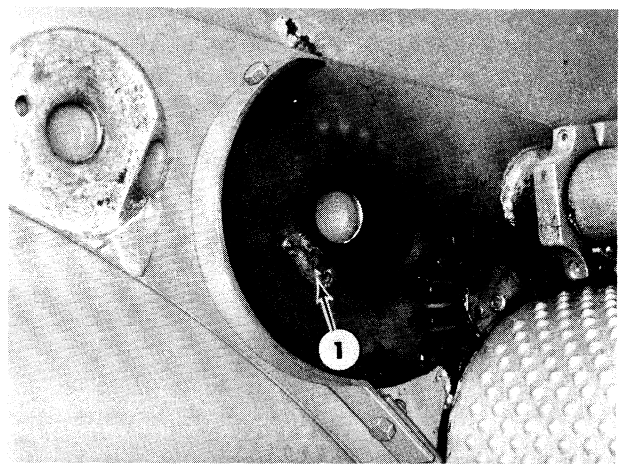


Figure 9-97

2048-8

LABOR GUIDE

	HOURS
FOLLOWER ROLL REMOVAL AND REPLACEMENT	
All Models	1.25
PIVOT ROLL REMOVAL, REPAIR, AND REPLACEMENT	4.00
PIVOT ROLL AND SLEDGE ROLL REMOVAL, REPAIR AND REPLACEMENT	
Model 634	9.00
Models 644, 654, 664	8.00
MIDDLE ROLL REMOVAL, REPAIR, AND REPLACEMENT	
Models 644, 654, 664	2.00
Middle Roll Idler Gear, R&R	2.25
STRIPPER ROLL - R&R	
Model 634	3.00
Models 644, 654, 664	1.25
Stripper Roll Idler Gear - R&R	1.50

INDEX

SECTION 10
HYDRAULIC SYSTEM

This section of the manual covers the tailgate lift hydraulic systems on all four balers and the hydraulic density control systems and optional hydraulic pickup lift on the Models 644, 654 and 664.

SAFETY

WARNING: ALWAYS PROTECT THE SKIN AND EYES FROM ESCAPING FLUID UNDER PRESSURE AS FLUID UNDER PRESSURE CAN HAVE SUFFICIENT FORCE TO PENETRATE THE SKIN AND CAUSE SERIOUS PERSONAL INJURY. IF INJURED BY ESCAPING FLUID, OBTAIN MEDICAL ASSISTANCE AT ONCE. SERIOUS INFECTION OR REACTION CAN OCCUR IF MEDICAL TREATMENT IS NOT ADMINISTERED IMMEDIATELY.

BEFORE DISCONNECTING LINES, HOSES OR FITTINGS, BE SURE THAT ALL PRESSURE IN THE SYSTEM HAS BEEN RELIEVED. BEFORE APPLYING PRESSURE TO A SYSTEM, CHECK TO BE SURE THAT ALL CONNECTIONS ARE TIGHT AND THAT ALL FITTINGS, LINES AND HOSES ARE NOT DAMAGED.

NEVER ADJUST RELIEF VALVES TO HIGHER PRESSURES THAN SPECIFIED FOR THE APPLICATION. HIGHER PRESSURES MAY RESULT IN FAILURE OF COMPONENTS IN THE SYSTEM OR MACHINE DAMAGE.

GAUGES, GAUGE FITTINGS AND HOSES MUST HAVE OPERATING PRESSURE RATINGS AT LEAST 25% HIGHER THAN THE HIGHEST PRESSURE OF THE SYSTEM.

GENERAL PROCEDURES

Clean the area around all connections that will be taken apart to reduce the chance of foreign material entering the system. Plug all open lines or fittings as soon as possible.

Replace any lost oil with the same type oil. Do not mix types of oil. The tailgate lift system oil should be compatible with the tractor hydraulic system. The density system is charged with Ford MC-134 oil. Refer to “Adding Oil” for compatible oils.

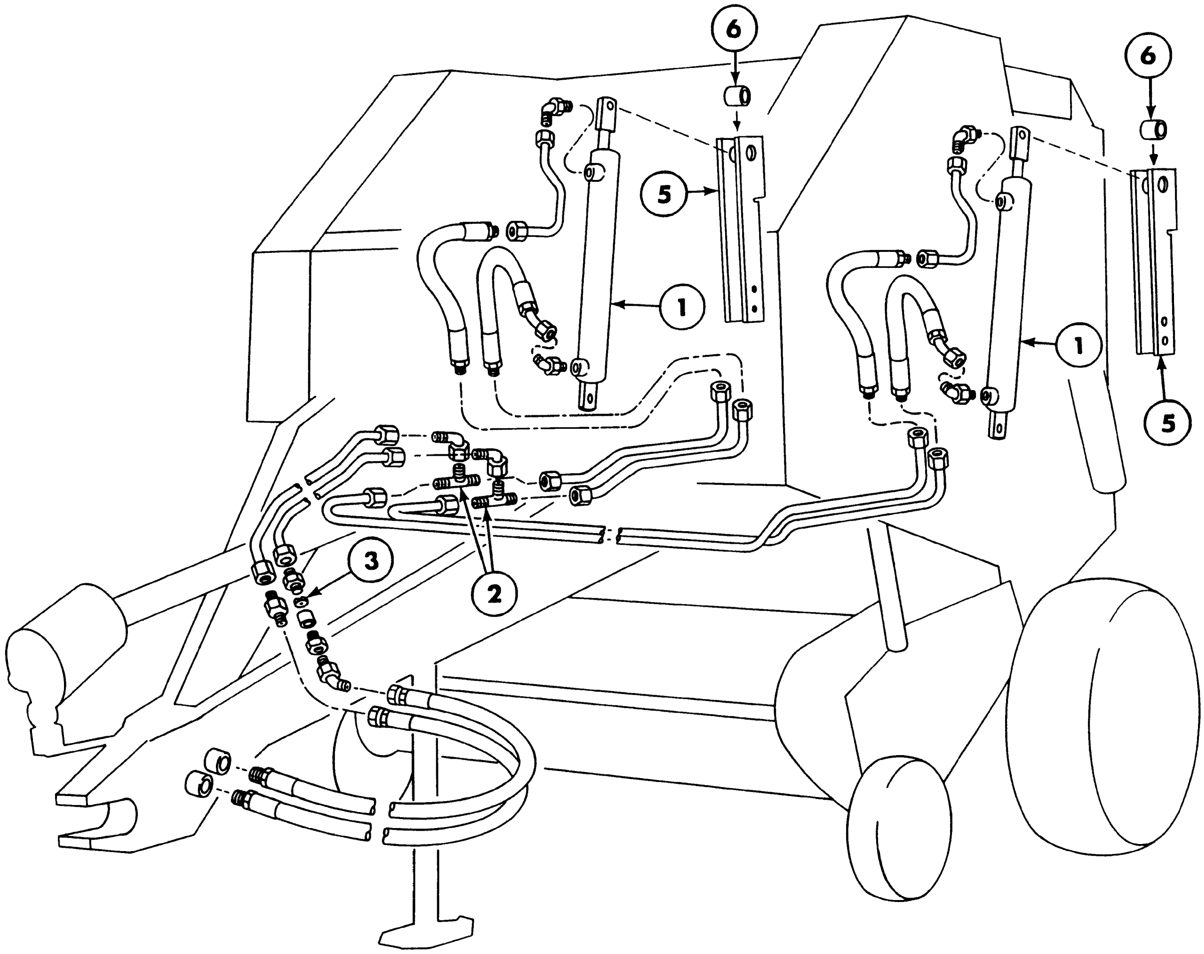


Figure 10-1

TAILGATE LIFT SYSTEM - MODEL 634

The tailgate lift system on the Model 634 consists of two cylinders, 1, and the steel lines and hoses required to connect them to the tractor. The lines to the cylinders are connected to a tee, 2, so that the cylinders operate together to raise or lower the tailgate. There is a 0.082″ (2.08 mm) orifice, 3, in the lift part of the circuit to regulate the speed of the tailgate. The slot in the orifice should be facing away from the tractor.

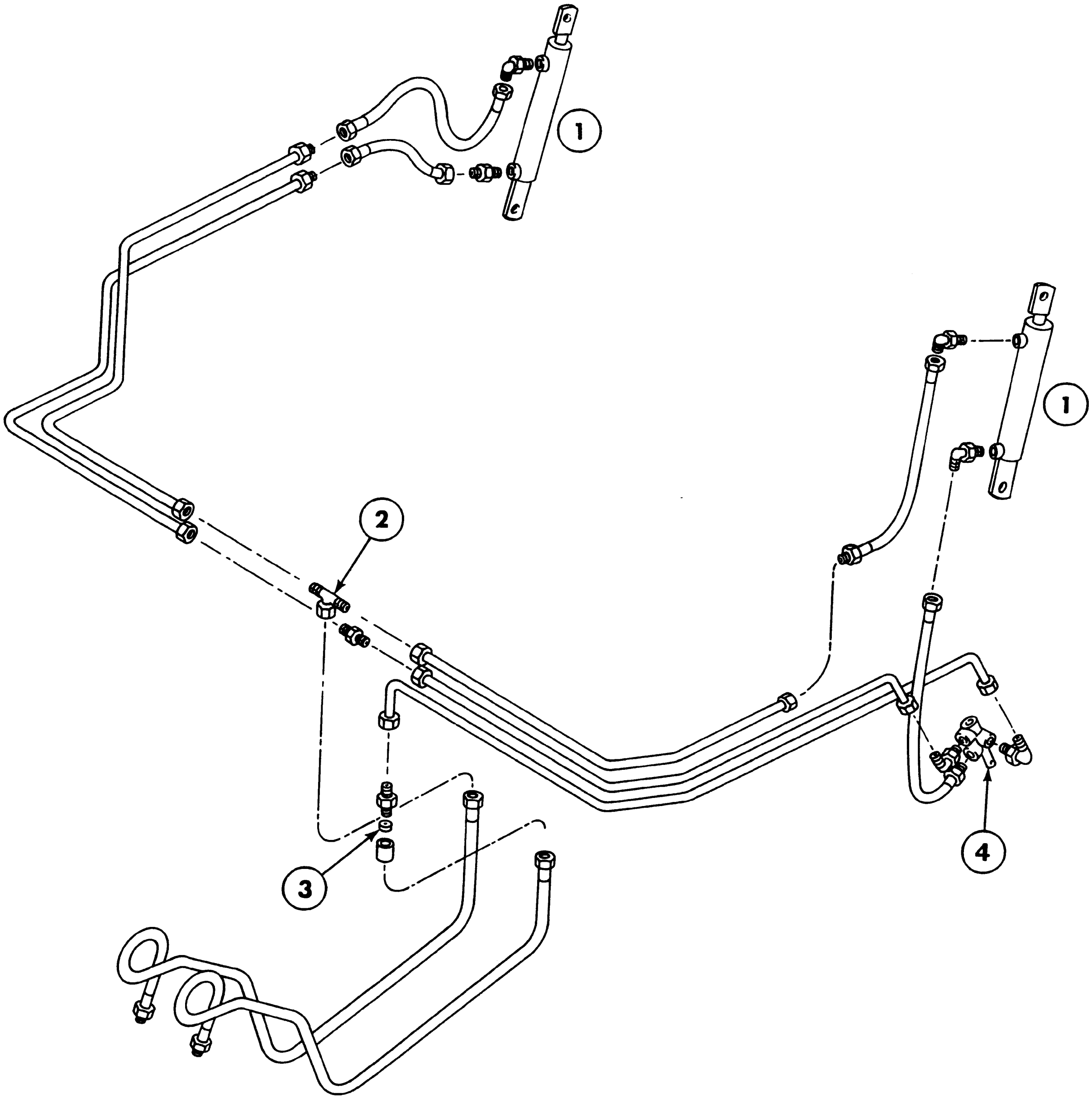


Figure 10-2

TAILGATE LIFT SYSTEM - MODELS 644, 654 AND 664

The tailgate lift system on these models consists of two cylinders, 1, a lockout valve, 4, and the steel lines and hoses to connect them to the tractor. There is a 0.104″ (2.6 mm) orifice, 3, in the line between the tractor and the lockout valve to regulate the speed of the tailgate. The slot in the orifice should be facing away from the tractor.

The lockout valve is connected to the bottom of each cylinder. The lines from the top of each cylinder are connected at a tee, 2, to the other hose to the tractor. When the lockout valve is placed in the lock position, oil is trapped in the base of both cylinders to keep them from moving. If one line should fail, the other cylinder will support the tailgate as the two lines are not connected together on the cylinder side of the valve.

TAILGATE LIFT CYLINDER

Removal

Close the tailgate and remove all pressure from the system by stopping the tractor engine and then moving the tractor remote control lever to both the open and close positions several times.

Clean the areas on and around the cylinder, 1, Figure 10-3, near the fittings that attach the lines or hoses to the cylinder.

Disconnect the lines from the fittings on the cylinder. Loosen the lines slowly to allow the release of any residual pressure. Plug the hoses and fittings.

Remove the cotter pin closest to the baler from the lower cylinder mounting pin, 2, in the tailgate latch and pull the pin out of the cylinder and latch.

Remove the cotter pin and washers from the upper cylinder mount, 3, and remove the cylinder. On the Model 634 this will also require removal of the tailgate lockout bracket, 4, Figure 10-4, and a spacer, 5, between the rod and lockout.

If the cylinder is being replaced, remove the fittings from the cylinder so they can be installed on the replacement cylinder.

Installation

If the cylinder is being replaced, install either the fittings removed from the old cylinder or new fittings.

Install the cylinder on the upper mount, 3, Figure 10-3, and install washers and a cotter pin to secure the cylinder.

NOTE: On the Model 634, be sure to reinstall the tailgate lockout bracket, 4, Figure 10-4, with a spacer, 5, on the outside of the rod when installing the cylinder. There should also be a 1-5/8″ (41.2 mm) ID washer between the lockout and the tailgate and a 1-3/8″ (35 mm) ID washer between the rod and tailgate pin.

Insert the cylinder in the tailgate latch and install the pivot pin, 2, Figure 10-3, and secure with a 1/4″ x 1-1/2″ cotter pin.

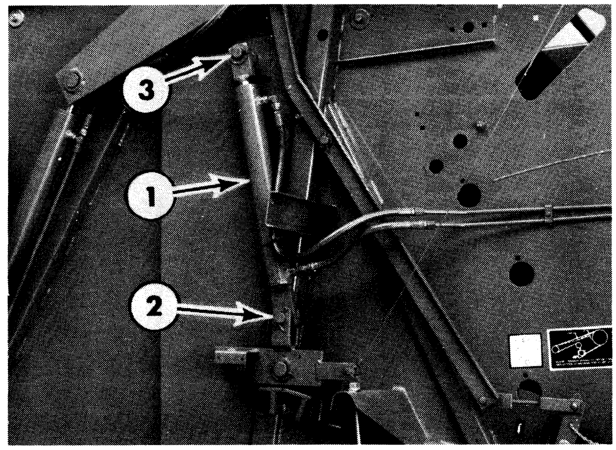


Figure 10-3

2369-7

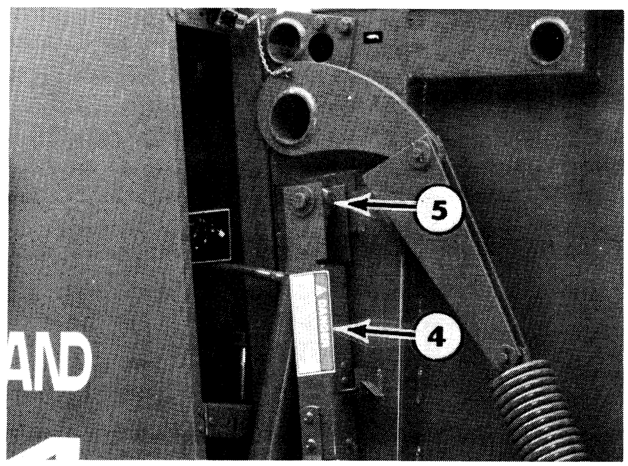


Figure 10-4

4116-11

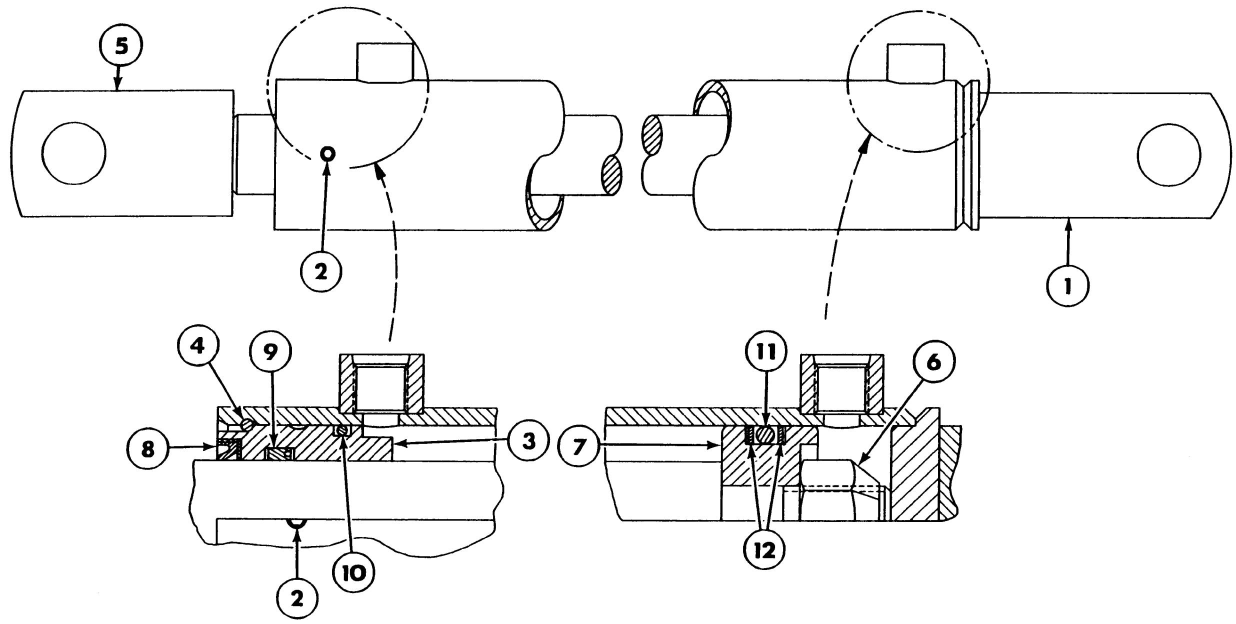


Figure 10-5

Connect The Lines To The Fittings

Connect the baler to a tractor and open and close the tailgate several times to purge air from the system.

Check for leaks at the fittings.

REPAIRING A TAILGATE CYLINDER

Refer to Figure 10-5.

NOTE: The repair procedure is the same for the tailgate cylinders on all four model balers. The only difference between cylinders is in the length.

Disassembly

Clean the cylinder assembly to reduce the possibility of damage to cylinder components.

Clamp the cylinder base, 1, Figure 10-5, in a vise. DO NOT clamp the barrel in a vise as it may be distorted by the pressure from the vise.

Remove the setscrew, 2, from the side of the barrel.

Using a large punch and a hammer, tap the cylinder head, 3, into the barrel until the snap ring, 4, is clear of the head.

Use a blunt screwdriver (remove all sharp edges on the tip) to work the snap ring up and out of the groove in the barrel and remove the snap ring. Use emery cloth to remove any nicks made in the cylinder during snap ring removal and thoroughly clean the end of the cylinder before removing the rod, 5, and head.

Remove the rod and head by grasping the rod end and rapidly pulling the assembly out of the cylinder. Cover the port near the head with a rag to catch any residual oil that may be forced out of the port when the piston is moved against the head.

Clamp the end of the rod in a vise to remove the piston nut, 6, piston, 7, and head assembly from the rod. DO NOT clamp on the piston or rod as they could be damaged.

Remove the seals, 8 and 9, and O ring, 10, from the head. The repair kit includes a new piston so it is not necessary to remove the O ring, 11, from the piston.

Inspection

The aluminum pistons develop sharp edges from contact with the cylinder wall. These edges are much like the feathered edges formed when sharpening a knife. After extended use, the edges can break off and become lodged between the piston and barrel and scratch both the piston and the barrel and also damage the O ring and back-up washers on the piston. The seal repair kit for these cylinders includes a new piston to reduce the chances of the piston wearing enough to cause damage to the barrel. The barrel should be cleaned and checked for scratches. Any small scratches should be removed before the cylinder is reassembled. If there are deep grooves in the piston, there most likely will be deep grooves worn in the barrel and the barrel should be replaced. If a cylinder is rebuilt with a scored barrel, it will not last long until it needs to be rebuilt again. It may be more economical to replace the barrel if there is any doubt. If a barrel shows rust in any area where the O ring must travel, it should be replaced.

If there was leakage around the cylinder rod, it should be inspected for dents and scratches. Rods cannot be repaired successfully to last very long. If any dents or scratches are found in the rod, it should be replaced.

Inspect the head for high wear or scratches from the rod. If the bore is worn over 0.005″ (0.127 mm) or severely scratched it should be replaced. Remove any sharp edges that may have formed in the bore of the head.

Assembly

Carefully and thoroughly clean all parts. Dirt or foreign particles will cause serious damage to the cylinder and hydraulic system.

Coat the seals, O rings, head, piston and cylinder wall with hydraulic oil or STP before assembling the cylinder.

Place the wiper seal, 8, Figure 10-5, over the rod with the lip facing away from the piston end.

Install the seal, 9, inside and the O ring, 10, on the outside of the head and slide the head on the rod with the snap ring groove facing away from the piston end.

Install the piston, 7, with the relief side facing the nut.

Install the locknut, 6, and tighten to 155 ft. lbs. (210 N·m). Clamp the end of the rod in a vise to hold it while tightening the nut. DO NOT clamp the rod in a vise as it could be damaged.

Install the O ring, 11, and back-up washers, 12, on the piston.

Lubricate the rod assembly and barrel. Slide the rod assembly into the barrel. Be careful not to damage the O rings and back-up washers on the edge of the barrel. Push or tap the head into the barrel only as far as required to be able to install the snap ring, 4. If the head is pushed in too far, the outer seal may be damaged.

Install the snap ring in the groove in the barrel.

Seat the snap ring by pulling on the rod to force the head against the snap ring.

Install the setscrew, 2, in the side of the barrel.

TAILGATE LOCKOUT VALVE - Models 644, 654 and 664

The tailgate lockout valve, 4, Figure 10-2, is also the connecting tee to join the line from the tractor remote valve to the lines to the base of each lift cylinder. The lines to the cylinders are not connected together on the cylinder side of the valve. When the valve is in the normal operating position, oil can pass through it in either direction when the tailgate is raised or lowered. When the valve is in the "Locked" position, no oil can pass through it in either direction and the tailgate will not move. If one of the lines to a cylinder fails, the other cylinder will still hold the tailgate in position.

Adjusting The Lockout Valve

Be sure the valve spool is in the fully "locked" position, i.e., the lower snap ring, 1, Figure 10-6, should be against the housing.

Loosen the two valve mounting screws just enough to be able to move the valve.

Position the valve so that when the lower part of the handle, 2, touches the lower end of the bottom slot at 3, the upper part of the handle clears the tab, 4, between the "locked" position and the operating position by less than 1/64″ (0.3 mm) and tighten the mounting screws. When the valve is in the operating position, the upper snap ring, 5, on the spool should be against the valve to allow full oil flow to the cylinders. When the valve is locked, the lower snap ring, 1, should be against the valve.

Testing The Lockout Valve

The lockout valve should hold the tailgate open when pressure is removed from the line to open the tailgate. A small amount of creep is normal for the valve. If the creep is excessive the valve should be repaired or replaced.

To test the lockout valve:

Check to be sure the handle and valve are adjusted correctly. The snap rings on the spool should contact the housing in both the locked and unlocked positions as shown in Figures 10-6 and 10-7 respectively.

Open and close the tailgate several times to be sure the lines are charged.

Open the tailgate halfway and place the valve in the locked position.

1. Try to move the tailgate using the tractor hydraulics. The tailgate should stay in the locked position.
2. Remove pressure from the valve input line. This can be done by stopping the tractor and moving the remote control lever to the raise and lower positions several times and then placing it in the float position. Measure the height of the tailgate. Wait 15 minutes and measure the height again. The tailgate is allowed to drop 10″ (254 mm) in the 15 minutes.

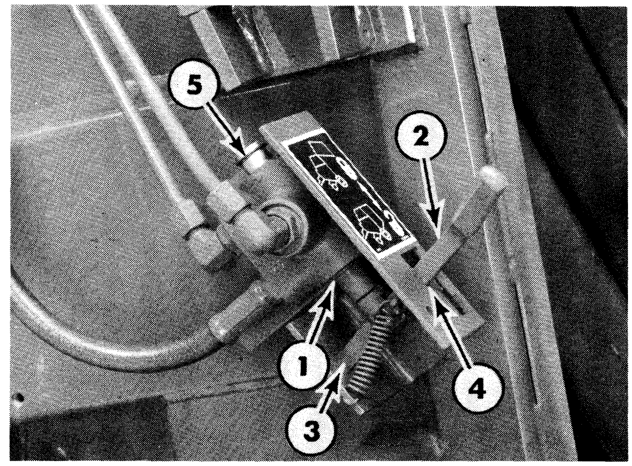


Figure 10-6

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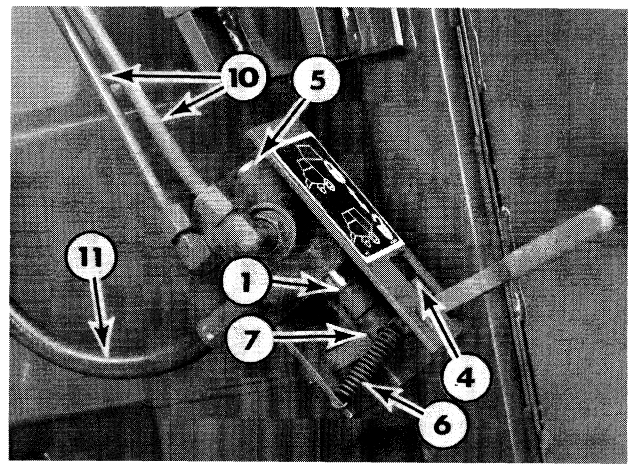


Figure 10-7

A4398-9

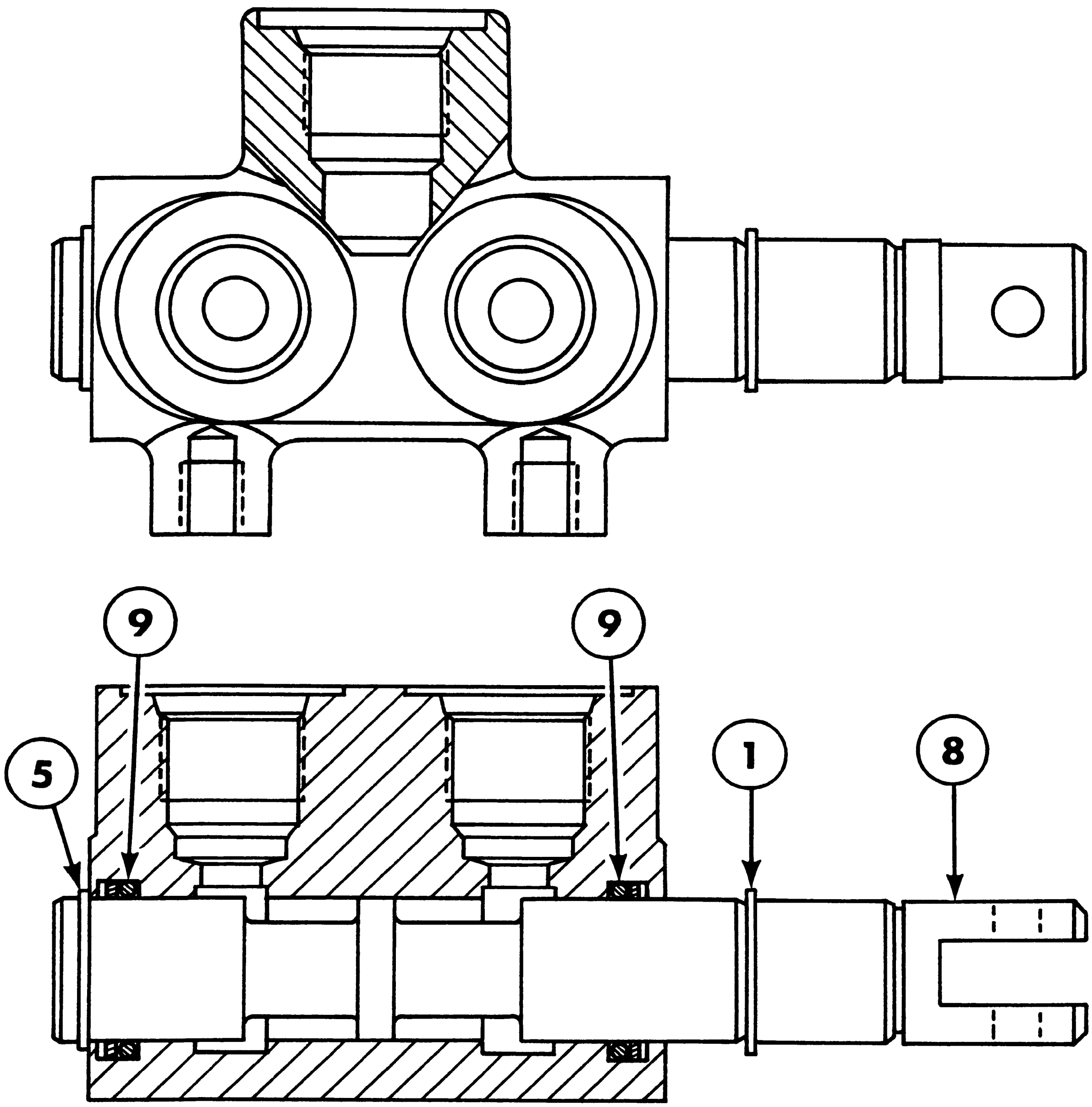


Figure 10-8

Repairing The Lockout Valve

The only parts of the valve that are available for service are the snap rings, O rings and back-up washers that are included in the repair kit. The kit can be installed without removing the valve from the baler.

To install the repair kit:

Clean the area around the valve.

Close the tailgate and release all pressure from the system.

Disconnect the valve handle spring, 6, Figure 10-7.

Remove the drive pin, 7, holding the handle to the valve spool and remove the handle.

Remove the snap ring, 5, Figure 10-8, at the top of the valve and push the spool, 8, through the valve.

Remove the other snap ring, 1, from the spool.

Remove the O rings and back-up washers at 9, from the valve body.

Clean the spool and the valve body.

Install the lower snap ring, 1, on the spool, 8.

Coat the new O rings and back-up washers, 9, with hydraulic oil and install in the valve body.

Coat the spool with hydraulic oil and carefully place the spool in the valve body.

Push the spool through the valve and install the upper snap ring, 5.

Attach the handle to the spool using a 3/16″ x 7/8″ drive pin at 7, Figure 10-7, and reconnect the handle spring, 6.

Charge the system by opening and closing the tailgate several times. Inspect for leaks at the valve.

Test operation of the lockout valve as described earlier in this section.

Replacing the Lockout Valve

Clean the area around the valve.

Close the tailgate and release all pressure from the system.

Remove the lines, 10, Figure 10-7, from the fittings on the valve. Plug the lines.

Remove the hose, 11, between the valve and left lift cylinder. Plug the cylinder fitting and hose ends.

Disconnect the valve handle spring, 6, Figure 10-7.

Remove the drive pin, 7, holding the handle to the valve spool and remove the handle.

Remove the two self-locking screws from the rear of the valve and remove the valve from the bracket.

Remove the fittings from the valve.

Install the new valve following the removal steps in reverse order, except do not tighten the valve mounting self-locking screws until the valve is adjusted as described in that section of this manual.

Charge the system by opening and closing the tailgate several times. Inspect for leaks at the fittings.

Test operation of the lockout valve as described earlier in this section.

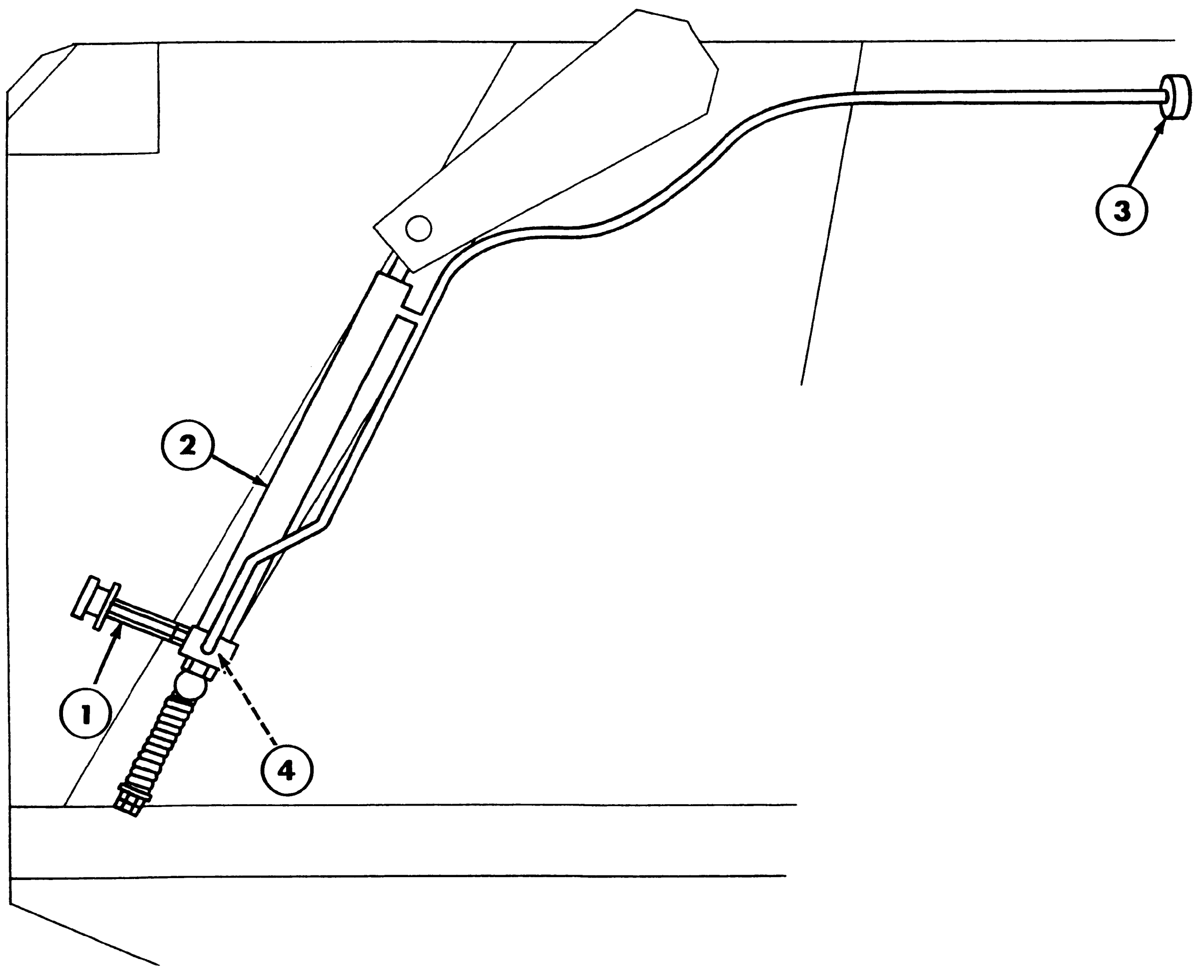


Figure 10-9

BELT TENSION SYSTEM

The belt tension system uses a relief valve in a self-contained hydraulic system to control the pressure applied to the belts. As the bale increases in size, movement of the take-up arm extends the rod(s) in the cylinder(s). The relief valve controls the force required to pull the rod out of the cylinder(s). If the pressure is increased, so is the tension on the belts. The pressure in the system is displayed on the gauge at the front of the baler.

The Models 644 and 654 have a single-cylinder density system.

The Model 664 has two-cylinders, but they are connected together to function in the same manner as a single-cylinder.

Density System

The relief valve, 1, Figure 10-9, for this type system is in the base of the cylinder. As the rod is pulled out of the cylinder, 2, oil must pass through the relief valve to enter the base of the cylinder. The hose to the pressure gauge, 3, is teed into the line between the rod end of the cylinder and the relief valve in the base end of the cylinder. A check valve, 4, allows oil to flow from the base end of the cylinder to the rod end when the bale is ejected and the tailgate closed.

The spring at the lower end of the cylinder keeps pressure on the belts when material is not being fed into the baler.

ADDING OIL

The density system is filled with New Holland 134-D hydraulic oil when the baler is shipped. Oil lost, due to a leak, should be replaced with New Holland 134-D hydraulic oil, part #85700812.

The reservoir for this system is included as part of the cylinder. Oil can be added to the system by connecting a hose to the quick-disconnect fitting, 1, at the rear of the pressure gauge. The other end of the hose should be attached to a remote outlet on a tractor with a compatible oil in its hydraulic system.

To make a hose to fill or charge the system, install a #9845231 female coupler and a coupler to match the tractor remote on a 1/4″ (6 mm) or larger ID hose that is at least 12′ (365 cm) long. The hose should be rated to withstand higher than the maximum pressure the tractor can supply. In most cases this would be at least 2500 PSI (172 bar).

To add oil:

Connect the hose to the tractor and the fitting, 1, on the baler.

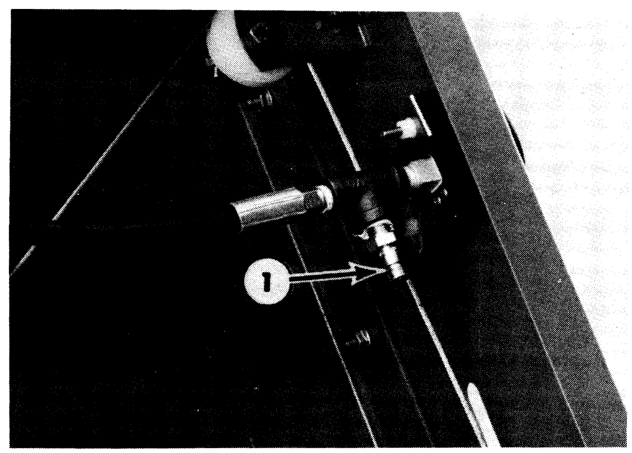


Figure 10-10

1632-1

Set the relief valve, 2, Figure 10-11, as low as possible by turning the knob counterclockwise.

Use the tractor remote outlet control to extend and retract the cylinder several times to fill the system and purge air from the system. If the cylinder does not extend when the line is pressurized, release the tension on the core pressure spring, 3, Figure 10-12, on the other side of the baler. Do not loosen the spring, 4, Figure 10-11, at the base of the cylinder.

Place the tractor remote control in the float position to remove pressure from the system.

Remove the hose connected to the tractor.

Adjust the relief valve, 2, to provide the desired pressure. This can be checked by watching the gauge and opening the tailgate.

Cycle the tailgate several times.

The gauge should not show any pressure when the tailgate is closed. If there is pressure in the system with the tailgate closed, bleed the line at the cylinder.

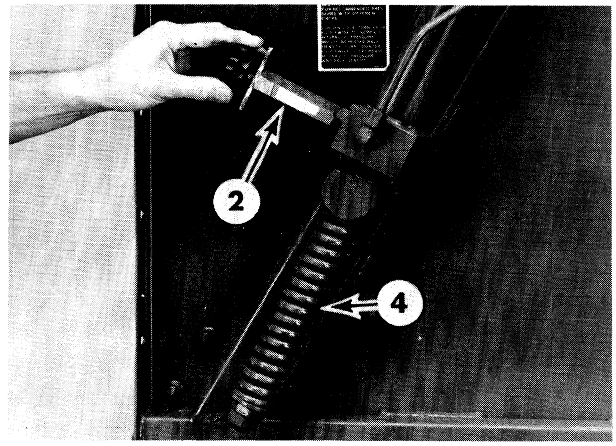


Figure 10-11

1490-9

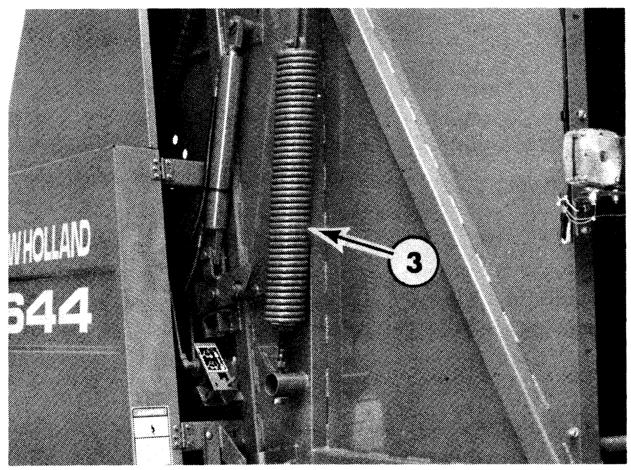


Figure 10-12

A4399-1

REPLACING THE DENSITY CYLINDER(S)

Removal

Turn the relief valve, 1, Figure 10-13, on the cylinder to the lowest setting, open the tailgate and install the lockout bolt, 1, Figure 10-14, on the Model 644 or engage the take-up arm lock, 1, Figure 10-15, on the Model 654 or 664.

Close the baler tailgate. Check to be sure there is no pressure in the system.

Remove the hose, 4, Figure 10-13, from the top fitting on the cylinder. Plug the loose end of the hose and fitting to keep foreign material out of them. On the Model 664, remove the hose at 5, Figure 10-15, and repeat on the opposite side at 5 and 6, Figure 10-16. Plug the hose ends.

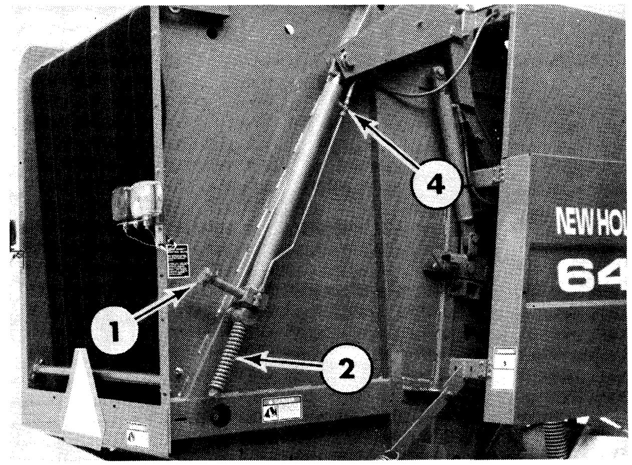


Figure 10-13

A4399-8

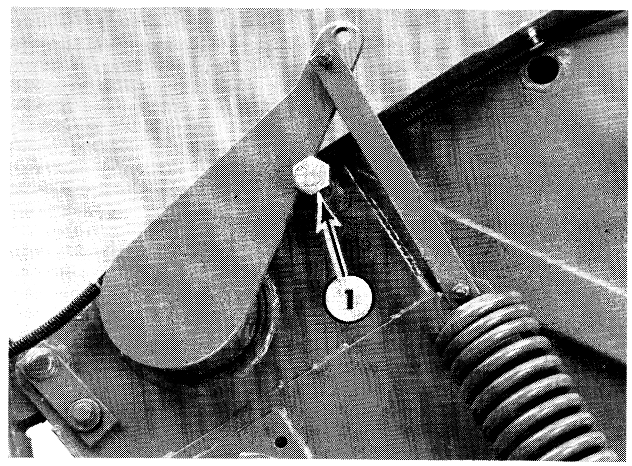


Figure 10-14

A4398-11

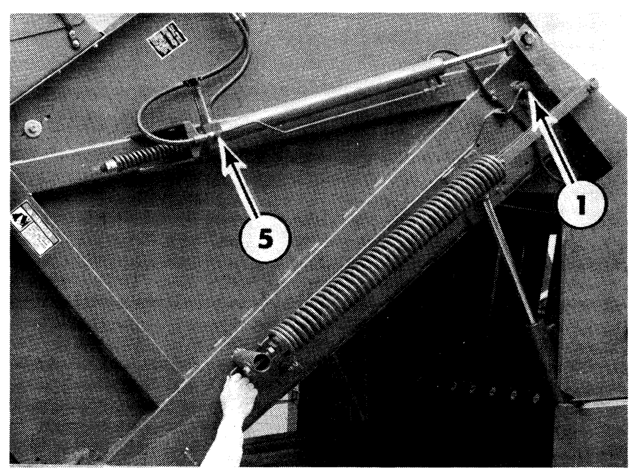


Figure 10-15

A3972-14

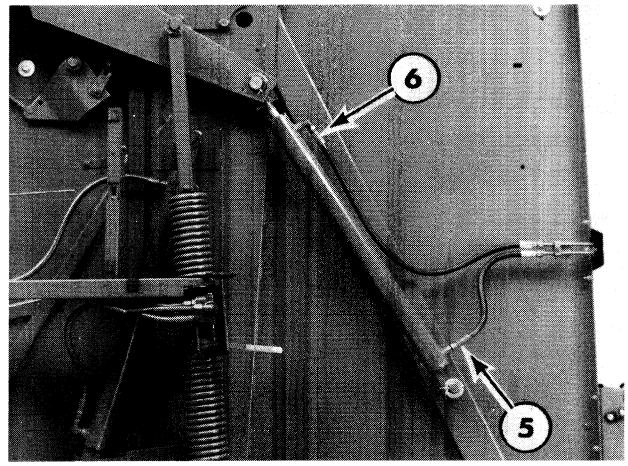


Figure 10-16

A3974-12

Remove the spring, 2, washers, and pivot, Models 654 and 664, on the rod attached to the base of the cylinder.

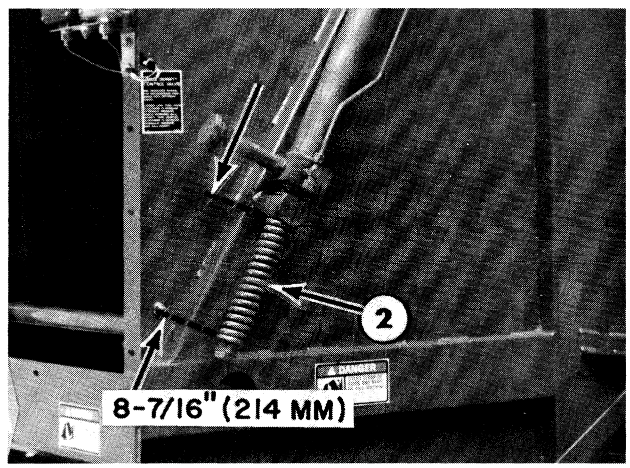


Figure 10-17

A4399-8

Remove the inner cotter pin, 6, at the take-up arm pin.

Remove the cylinder rod pivot pin from the take-up arm. Be careful to not lose the washers on either side of the cylinder rod.

Remove the cylinder and washer from the lower mount.

Remove the fittings and tube from the cylinder if replacing the cylinder or barrel.

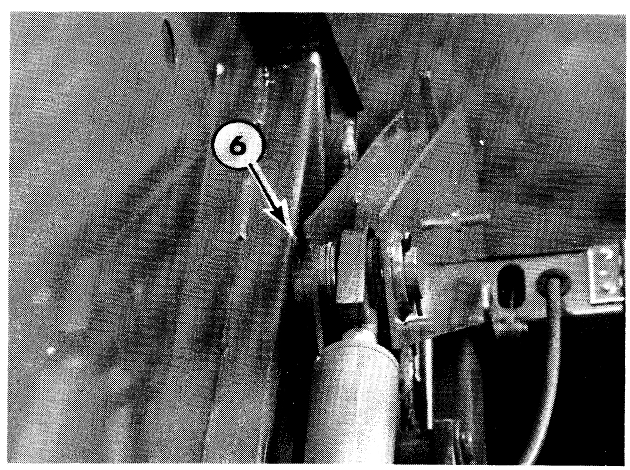


Figure 10-18

A4399-7

Installation

If the barrel or cylinder is being replaced, install the fittings and tube removed from the original cylinder.

Install a washer on the rod at the base of the cylinder and place it through the mount as shown in Figure 10-17. Install a pivot block, Models 654 and 664, spring, 2, washer and 7/8″ jam nut on the rod in that order.

Reinstall the rod end of the cylinder to the take-up arm with the pivot pin and washers as shown in Figure 10-18.

Tighten the jam nut to obtain a spring length of 8-7/16″ (214 mm) and install a second jam nut to lock it.

Connect the hose, 4, Figure 10-13, to the fitting at the top of the cylinder. On the Model 664, attach hoses, 5 and 6, as shown in Figure 10-15.

Raise the tailgate and remove the lock, 1, Figure 10-15, or lockout bolt, 1, Figure 10-14.

Close the tailgate.

Charge the system and adjust the relief valve. Refer to the instructions listed previously in this section.

Check for leaks and repair if required.

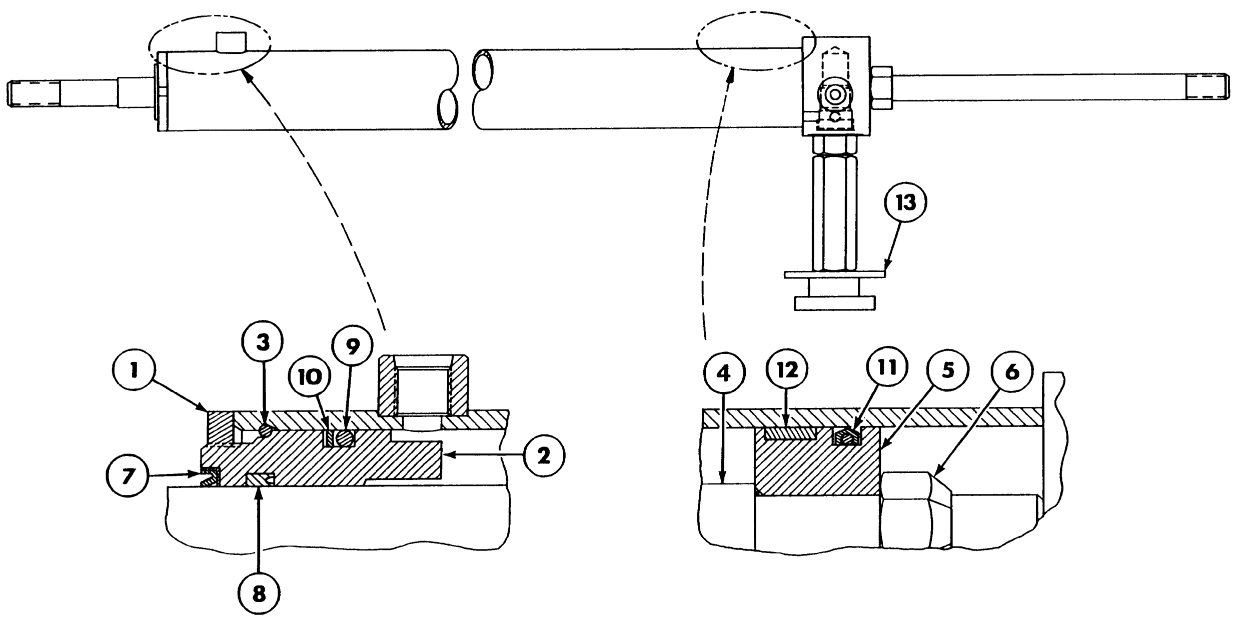


Figure 10-19

DENSITY SYSTEM CYLINDER REPAIR

NOTE: The repair procedure is similar for the density cylinders on all three model balers. The primary difference is the way the head is secured to the barrel.

Disassembly

Single- and double-cylinder system cylinders

Clean the cylinder assembly to reduce the possibility of damage to cylinder components.

Remove the relief valve, 13, Figure 10-19.

Clamp the cylinder base in a vise. DO NOT clamp the barrel in a vise as it may be distorted by the pressure from the vise.

Use a spanner wrench to remove the nut, 1, Figure 10-19, securing the head.

Using a large punch and a hammer, tap the cylinder head, 2, Figure 10-19, into the barrel until the snap ring, 3, is clear of the head.

Use a blunt screwdriver (remove all sharp edges on the tip) to work the snap ring up and out of the groove in the barrel and remove the snap ring. Use emery cloth to remove any nicks made in the cylinder during snap ring removal and thoroughly clean the end of the cylinder before removing the rod and head.

Remove the rod, 4, and head by grasping the end and rapidly pulling the assembly out of the cylinder. Cover the port near the head with a rag to catch any residual oil that may be forced out of the port when the piston, 5, is moved against the head.

Place a wrench on the flats on the take-up arm end of the rod, 4, to remove the piston nut, 6; piston, 5; and head assembly, 2, from the rod. DO NOT clamp on the piston or portion of the rod that passes through the seal as they could be damaged.

Remove the seals, O rings, and back-up washers from the head and piston.

Inspection

The aluminum pistons develop sharp edges from contact with the cylinder wall. These edges are much like the feathered edges formed when sharpening a knife. After extended use, the edges can break off and become lodged between the piston and barrel and scratch both the piston and the barrel and also damage the O ring and back-up washers on the piston. The barrel should be cleaned and checked for scratches. Any small scratches should be removed before the cylinder is reassembled. If there are deep grooves in the piston, there most likely will be deep grooves worn in the barrel and the barrel should be replaced. If a cylinder is rebuilt with a scored barrel, it will not last long until it needs to be rebuilt again. It may be more economical to replace the barrel if there is any doubt. If a barrel shows rust in any area where the O ring must travel it should be replaced.

If there was leakage around the cylinder rod, it should be inspected for dents and scratches. Rods cannot be repaired successfully to last very long. If any dents or scratches are found in the rod, it should be replaced.

Inspect the head for high wear or scratches from the rod. If the bore is worn over 0.005″ (0.127 mm) or severely scratched it should be replaced. Remove any sharp edges that may have formed in the bore of the head.

Assembly

Carefully and thoroughly clean all parts. Dirt or foreign particles will cause serious damage to the cylinder and hydraulic system.

Coat the seals, O rings, head, piston and cylinder wall with hydraulic oil or STP before assembling the cylinder.

Place the wiper seal, 7, Figure 10-19, over the rod with the lip facing away from the piston end.

Install the seal, 8, inside and the O ring, 9, and back-up washer, 10, on the outside of the head, 2, and slide the head on the rod, 4, with the snap ring groove facing away from the piston end.

Install the piston, 5, on the rod with the relief side facing toward the nut.

Install the locknut, 6. Place a wrench on the flats on the take-up arm end of the rod. DO NOT clamp on the piston or portion of the rod that passes through the seal as they could be damaged. Tighten the locknut on the rod to 100 ft. lbs. (135 N·m).

Install the O ring, 9, and back-up washer, 10, on the head and the seal, 11, and wear ring, 12, on the piston.

Lubricate the rod assembly and barrel. Slide the rod assembly into the barrel. Be careful not to damage the O rings and back-up washers on the edge of the barrel. Push or tap the head, 2, into the barrel only as far as required to be able to install the snap ring, 3. If the head is pushed in too far, the outer seal may be damaged.

Install the snap ring in the groove in the barrel.

Seat the snap ring by pulling on the rod to force the head against the snap ring.

Apply two drops of Loctite 242 (or equivalent thread locking compound) to the threads and install the head retaining nut. Tighten the nut to 70 ft. lbs. (95 N·m).

Install the fittings in the cylinder.

Install the relief valve, 13, in the cylinder.

RELIEF VALVE

The relief valve, 1, Figure 10-20, is installed in the base of the cylinder. A check valve is included in the relief valve. As the bale is formed, the rod is pulled out of the cylinder and creates pressure in the line between the top and bottom of the cylinder. The poppet, 1, Figure 10-21, in the valve remains seated as shown until pressure builds to the preset level and the oil is trapped in the line between the top of the cylinder and the base.

When the pressure reaches the preset level, the poppet is forced off its seat as shown in Figure 10-22 and oil from the top of the cylinder enters the base of the cylinder to maintain the pressure at the preset level. When the bale is ejected and the tailgate closed, the ball, 2, Figure 10-23, in the valve is raised off its seat as shown in Figure 10-23 and oil returns from the base of the cylinder to the top.

Replacing the relief valve

Clean the cylinder assembly around the relief valve, 1, Figure 10-20, to reduce the possibility of dirt entering the cylinder or valve.

Loosen the lock and turn the adjusting handle, 2, out as far as possible. Check to be sure there is no pressure in the system.

Remove the valve assembly from the cylinder.

Install the new valve assembly in the cylinder. Tighten the base of the valve to 50 ft. lbs. (68 N·m).

Charge the system with oil. Refer to the "Adding Oil" procedure listed previously in this section.

Open the tailgate to check the maximum pressure. The pressure should be between 2300 and 2400 PSI (158 and 166 bar) on the Models 644, 654; or 2000 to 2150 (138-148 bar) on the Model 664. If the maximum pressure is not correct, adjust the valve following the instructions listed later in this section.

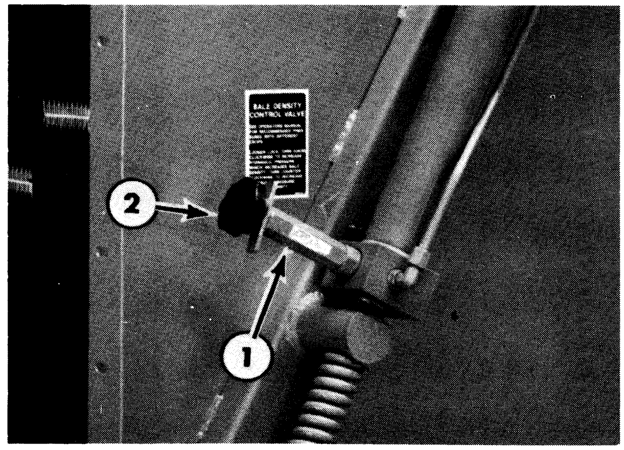


Figure 10-20

1487-9

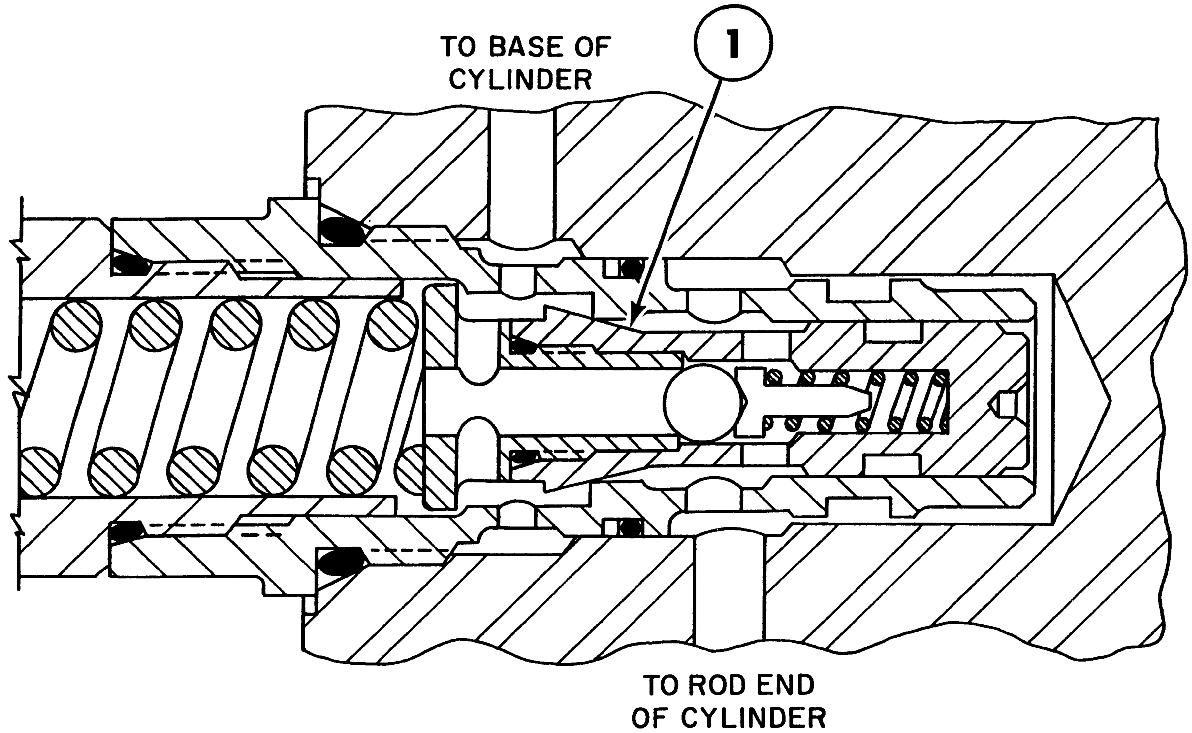


Figure 10-21

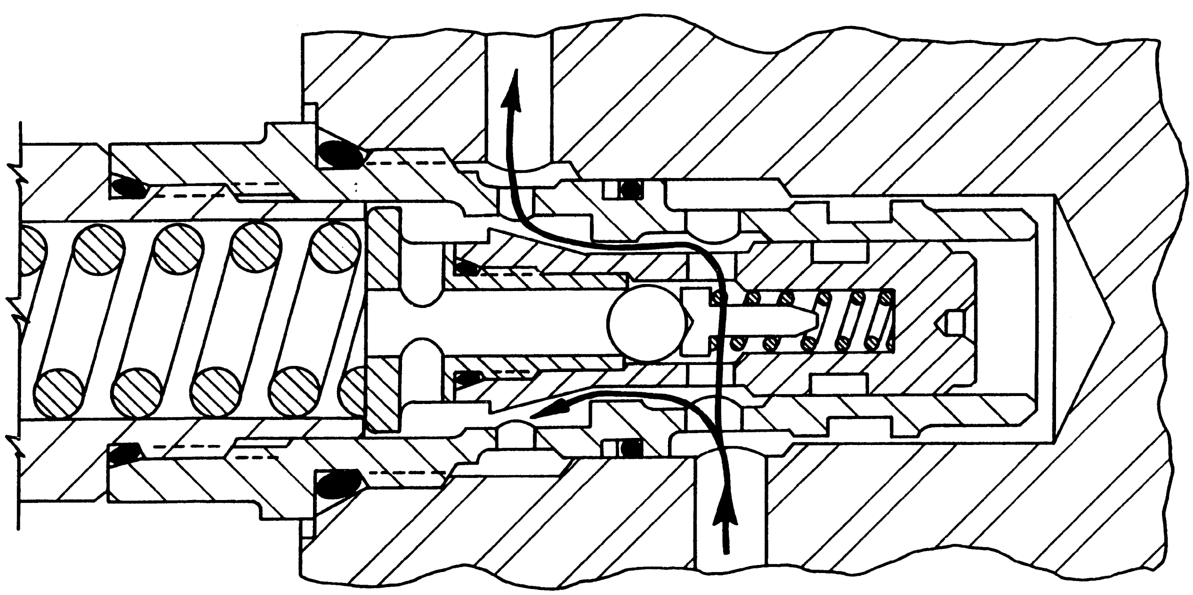


Figure 10-22

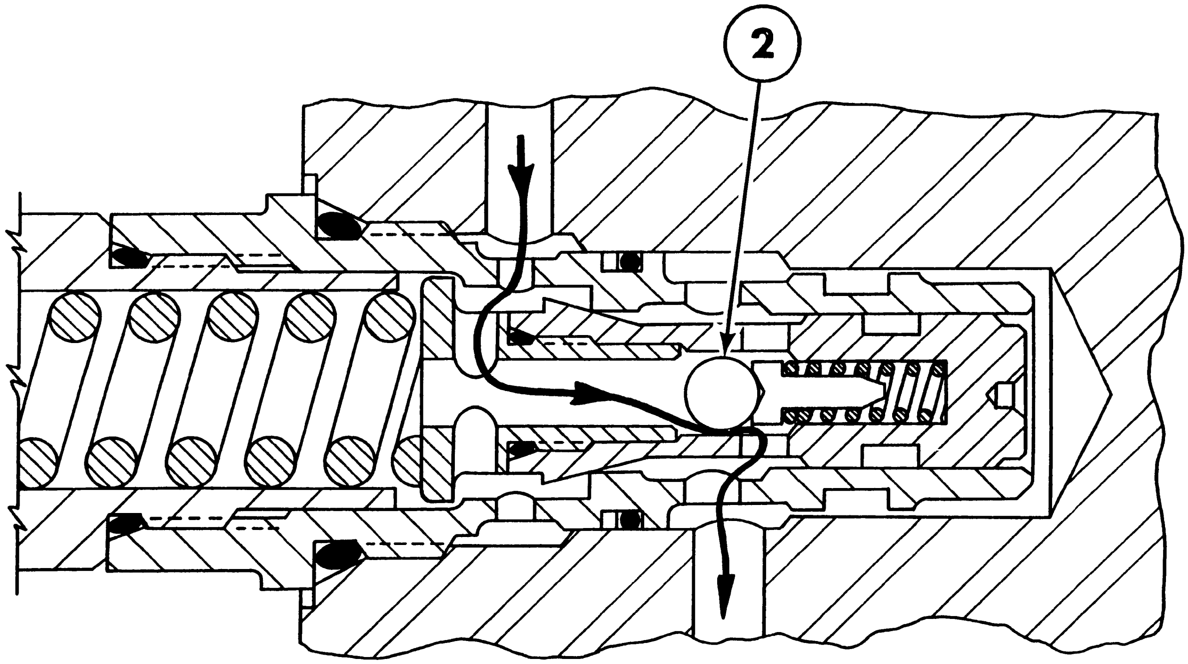


Figure 10-23

Cleaning The Relief Valve

If the density system becomes contaminated with foreign material, the relief valve poppet may not seat properly to allow the pressure to reach the desired setting. The valve can be taken apart as shown in Figure 10-24 and cleaned to allow the poppet to seat. Follow the procedure for "Replacing Relief Valve Seals" to clean the valve.

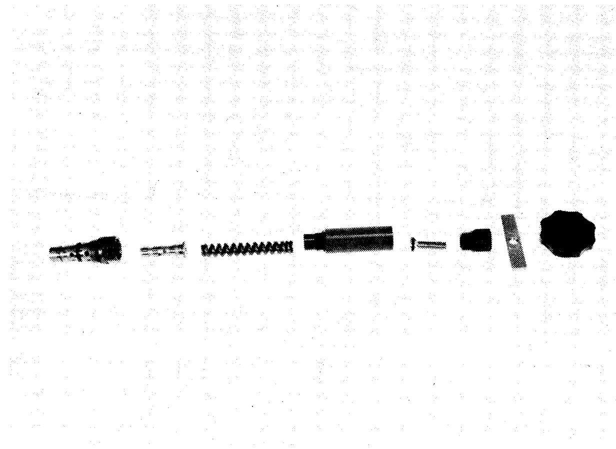


Figure 10-24

2724-4

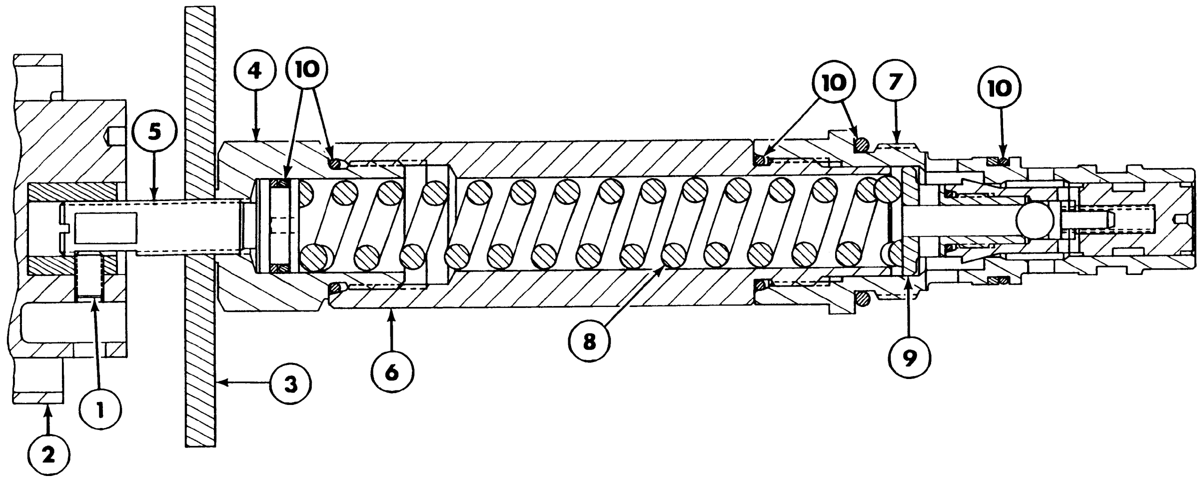


Figure 10-25

Replacing Relief Valve Seals

Clean the cylinder assembly around the relief valve to reduce the possibility of dirt entering the cylinder or valve.

Loosen the lock and turn the adjusting knob out as far as possible. Check to be sure there is no pressure in the system.

Remove the relief valve from the cylinder.

Loosen the setscrews, 1, Figure 10-25, in the knob, 2.

Remove the knob and lock, 3.

Remove the cap, 4, and adjusting stem, 5, from the outer end of the barrel

Remove the barrel, 6, from the valve body, 7, to remove the spring, 8, and the poppet assembly, 9.

Remove the adjusting stem from the outer cap.

Remove the O rings, 10, and back-up washers from the adjusting stem and valve body.

Clean all parts.

Coat the new O rings, 10, and backup washers with hydraulic oil and install on the valve body, 7, and adjusting stem, 5.

Install the adjusting stem, 5, in the outer cap, 4, as far as possible. Install the lock, 3, on the stem but DO NOT install the knob until the assembly is adjusted.

Install the outer cap on the barrel, 6. Tighten the cap to 25 ft. lbs. - 30 ft. lbs. (34 N·m - 40 N·m).

Place the poppet in the valve body, 7, and the spring in the barrel and install the barrel on the body. Tighten the barrel to 25 ft. lbs. - 30 ft. lbs. (34 N·m - 40 N·m).

Install the valve assembly in the cylinder and tighten to 50 ft. lbs (68 N·m).

Charge the system with oil and adjust the maximum pressure setting of the valve.

Adjusting The Maximum Pressure Of The Relief Valve

Loosen the lock, 3, Figure 10-25, for the adjusting knob.

Remove the knob, 2, by removing the two setscrews, 1.

Use a screwdriver to turn the valve stem, 5, clockwise until it bottoms out.

Open the tailgate to check the pressure. If the pressure is over 2400 PSI (166 bar), Models 644 and 654, or 2150 (148) bar on the Model 664. Close the tailgate and adjust the valve stem counterclockwise. Repeat until the pressure is correct.

NOTE: DO NOT set the pressure over 2400 PSI (166 bar) on the Models 664 and 654 or 2150 (148 bar) on the Model 664.

When the setting is correct, turn the lock, 3, down against the valve body.

Install the knob, 2, so it is against the lock. Align the setscrews, 1, with the flats on the stem and tighten them.

Adjust the valve to the desired pressure before starting to bale.

HYDRAULIC PICKUP LIFT

The optional pickup lift uses a single-acting hydraulic cylinder, 1, Figure 10-26, of the "ship-in-a-bottle" design. There is an orifice, 2, between the elbow, 3, and adapter fitting, 4, at the cylinder to reduce the cylinder lift speed. The slot in the orifice should be facing away from the cylinder. If the orifice is reversed, the pickup will rise too fast. In some cases, it may be necessary to install two #88612 washers to keep the orifice from flipping over.

Repairing The Pickup Lift Cylinder

Clean the area around the cylinder, 1, Figure 10-26.

Turn the manual lift crank until it carries the weight of the pickup.

Be sure there is no pressure in the line to the cylinder and disconnect the hose from the elbow fitting, 3.

Remove the adapter fitting, 4, and elbow as an assembly from the cylinder.

Remove the cylinder from the baler.

Clamp the base of the cylinder in a vise with the port facing up.

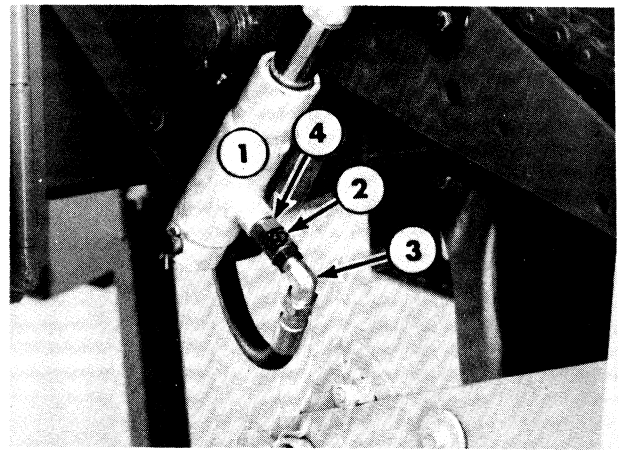


Figure 10-26

2545-7

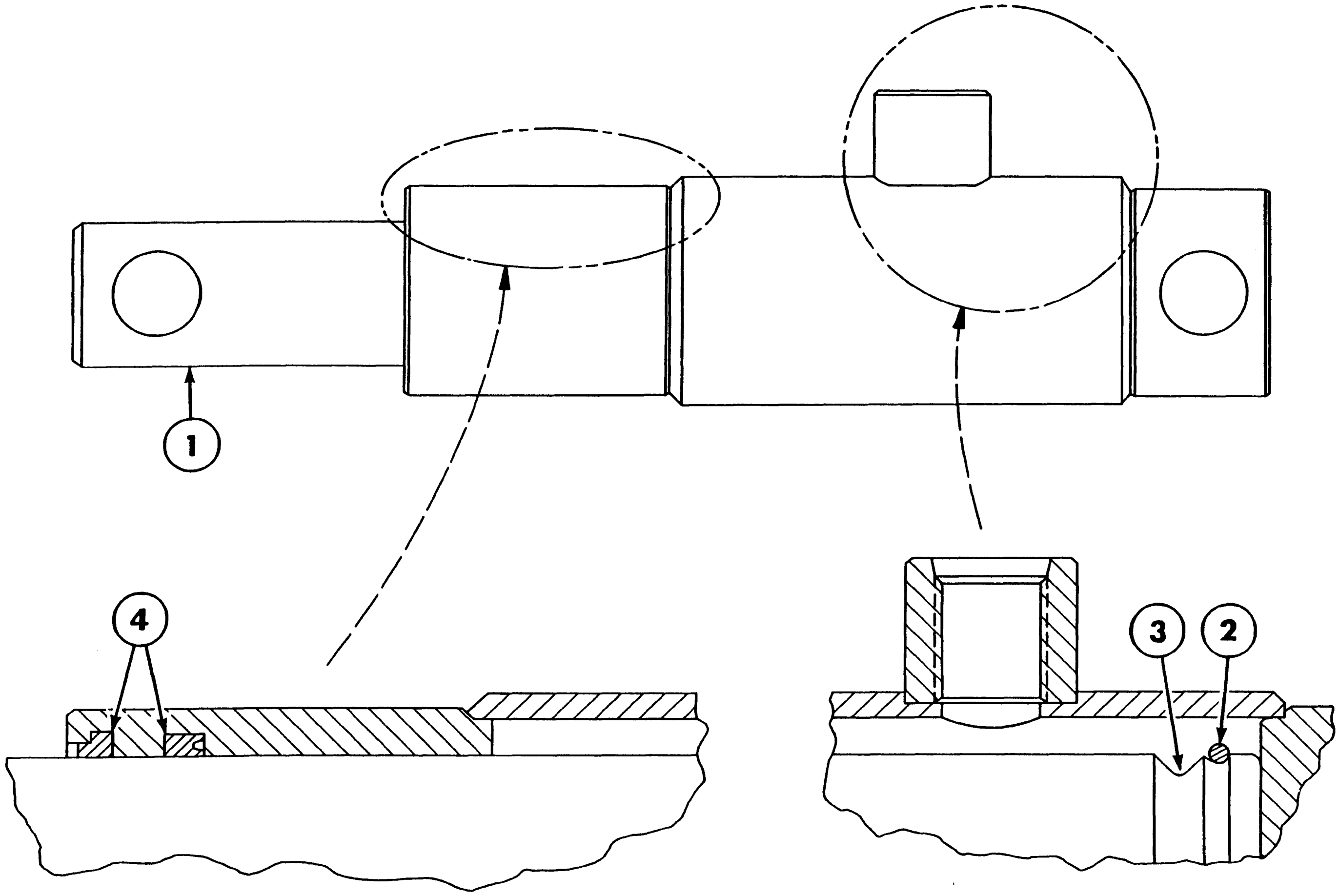


Figure 10-27

Pull the rod,1, Figure 10-27, out of the cylinder until the retaining ring, 2, on the rod is visible through the port.

Insert a screwdriver through the port and pry the retaining ring out of its groove and into the notch, 3, in the rod and then pull the rod out of the cylinder.

Remove the retaining ring from the rod.

Remove the seals, 4, from the barrel.

Clean the rod and barrel.

Coat the new seals, 4, with hydraulic oil and install in the barrel.

Coat the rod and retaining ring, 2, with hydraulic oil and place the retaining ring in the notch, 3, in the rod. Install the rod in the barrel until the retaining ring is visible through the port.

Insert a screwdriver through the port and work the retaining ring from the notch and into the groove in the rod.

Reinstall the cylinder on the baler as shown in Figure 10-26.

Install the adapter fitting, 4, and elbow assembly in the cylinder and attach the hose to the fitting.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
Internal leakage.	Worn or damaged seals.	Replace.
	Piston nut not tight.	Torque to specification.
External leakage.	Worn or damaged seals.	Replace.
	Internal leakage in a single-acting cylinder.	See internal leakage.
Tailgate opens slowly.	Restriction in line.	Remove restriction.
	Lockout valve incorrectly adjusted.	Readjust so spool has full travel.
	Orifice installed wrong.	Install with slot facing away from tractor.
	Incorrect orifice.	Install 0.104″ orifice.
	Low flow or pressure.	Repair tractor hydraulic system.
Tailgate closes fast.	No orifice in line.	Install orifice.
	Orifice installed wrong.	Install with slot facing away from tractor.
Tailgate drifts open.	Internal leak in cylinder.	See internal leakage.
	Tractor remote not sealing.	Repair tractor.
	Tailgate not latched.	Check latch is locked before baling.
Density pressure drop (some drop is normal when not adding crop).	Internal leakage.	See internal leakage.
	Air in the system.	Bleed the system.
	Dirt in the relief valve.	Clean valve.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Pressure not at 0 when ready to start baling.	Change in temperature.	Cycle the tailgate open arm closed several times.
Pressure does not return to 0 when bale is ejected.	System over filled.	Bleed system.
	Interference between take-up arm and side.	Remove interference.
	Defective gauge.	Replace gauge.
Cannot get maximum pressure.	Knob not adjusted on valve stem - single cylinder.	Adjust valve stem and knob.
	Internal leakage.	See internal leakage.
	Dirt in relief valve.	Clean valve.
Pickup rises too fast .	Orifice missing or reversed.	Install with slot facing away from cylinder.

LABOR GUIDE

	HOURS
Bleed Density System	0.25
Charge Density System	0.50
Check Valve, R & R	0.50
Density Cylinder	
R & R	1.00
R, R, Rebuild	1.50
Replace Seals	0.50
Hose, R & R	0.50
Orifice, Tailgate Opening R & R	0.50
Pickup Lift Cylinder	
R & R	0.50
Replace Seals	0.50
Replace Orifice	0.25
Relief Valve	
R & R	0.25
Clean And Replace Seals	0.50
Adjust	0.25
Tailgate Lockout Valve	
R & R	1.00
Reseal	0.50
Adjust	0.25
Tailgate Lift Cylinder	
R & R	0.75
R & R, Rebuild	1.50
Replace Seals	0.50

INDEX

SECTION 11

TWINE WRAPPER SYSTEM MODEL 634

The Model 634 uses a single arm twine wrapper, 1, that has two twine tubes for twine to reduce the time required to wrap each bale. See Figure 11-1. The wrapper is electrically controlled, allowing the operator to apply the desired number of wraps per bale. As the twine arm moves to the home position after wrapping a bale, the spring-loaded knife assembly is automatically activated to cut both twines. See 2, Figure 11-1.

In this section, the following areas will be described:

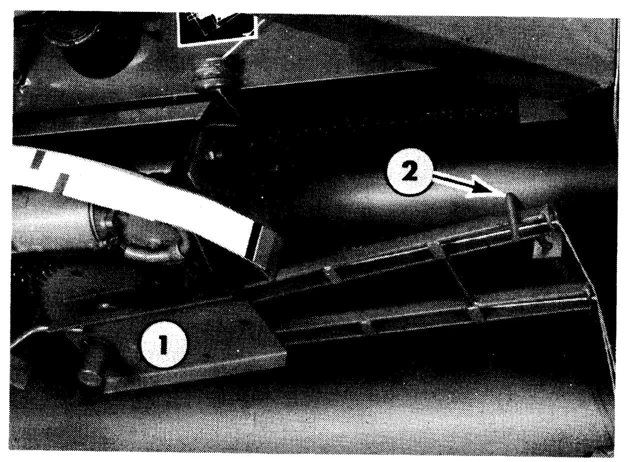


Figure 11-1

9641-11

ADJUSTMENTS

Drive Chains

When drive chains, 1, become loose, requiring adjustment, loosen cap screw, 2. Move the double sprocket in the direction to tighten both chains evenly and secure cap screw, 2.

NOTE: Double sprocket, 3, must be positioned such that when the wrapper arm is in the "home" position, with knife closed, lube fitting, 4, is pointing directly forward for access with a grease gun.

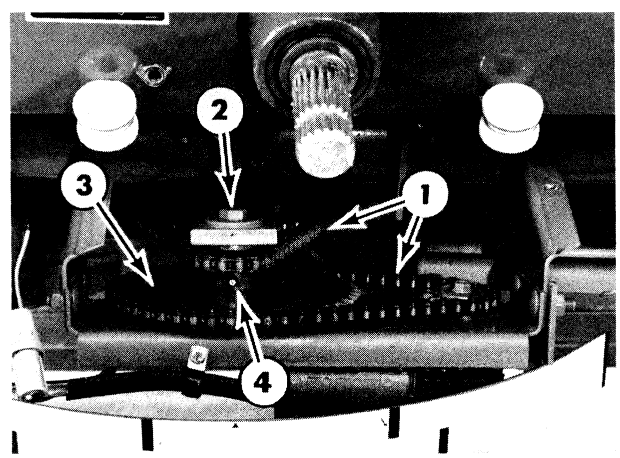


Figure 11-2

2758-6

Wrapper Arm Clearance

Rotate the wrapper arm to the closest point with the twine knife assembly. If the wrapper arm tubes are not centered vertically in the opening between the knife and the ledger plate, loosen cap screws, 1, Figure 11-3, and move the arm. Tighten cap screws, 1.

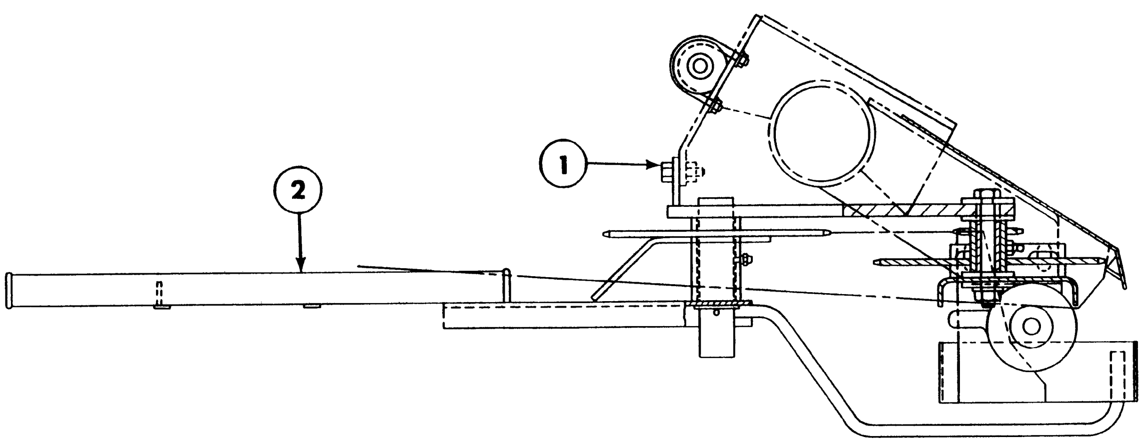


Figure 11-3

Return the wrapper arm to the home position, as shown. Be sure the twine arm does not contact knife trip rod support plate, 1.

Rotate the wrapper arm through an entire cycle to ensure proper clearance with stripper roll and movement through the knife area.

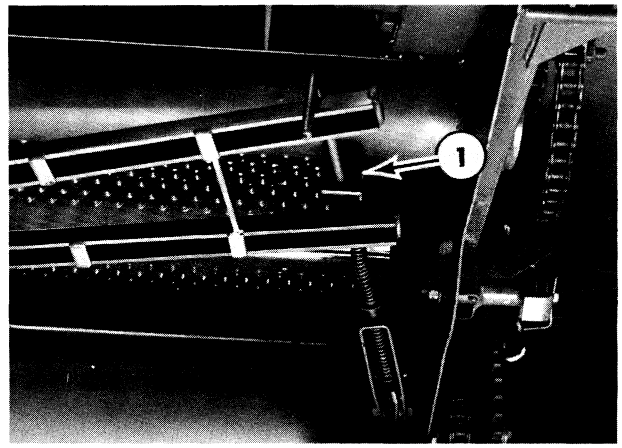


Figure 11-4

2758-7

Twine Knife

Inspect knife, 1, for complete contact with striker mount, 2. If adjustment is required, loosen the knife hardware for minor adjustment. If the knife is dull, it can be sharpened or reversed, as the knife has a double edge.

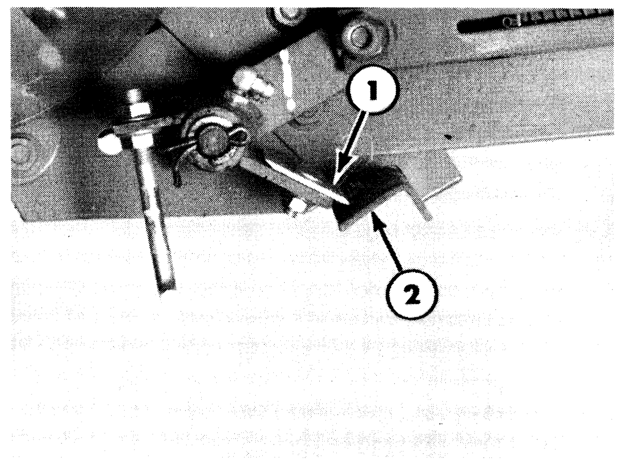


Figure 11-5

A3967-12

DRIVE MOTOR

Removal

Remove the cap screws securing the shield over the drive area and remove the shield.

Loosen the M12 cap screw at 1. Shift sprocket assembly, 2, until drive chain, 3, can be removed from the motor drive sprocket.

Remove the M8 flange nut and motor sprocket at 4.

Remove the wire clamp at 5, and disconnect the wires at connector, 6.

Loosen and remove the three cap screws at 7, securing the motor to the channel mount.

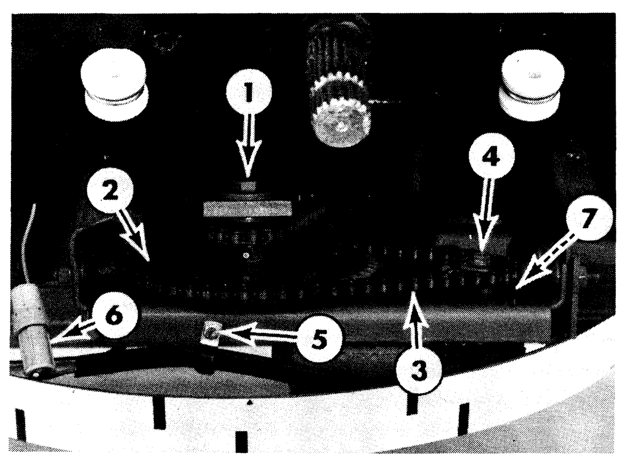


Figure 11-6

2758-6

NOTE: There are three spacer washers between the motor drive housing and channel mount on each cap screw.

Inspection

Using a 12-volt power source, recheck the motor-drive unit. If the motor or drive unit fails to operate, replace the unit. If the motor and drive operate in both directions when the power source is reversed, recheck the power source to the control box.

Installation

Reverse the removal procedure. Adjust the drive chain as shown in Figure 11-2.

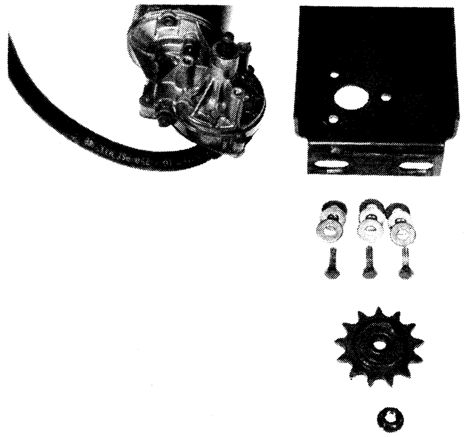


Figure 11-7

2758-10

TWINE ARM/CHAIN & SPROCKET DRIVE

Removal

Remove the two self-tapping screws securing the shield over the wrapper drive. Remove shield, 1.

Remove the cap screw at 2. Remove sprocket weld assembly, 3.

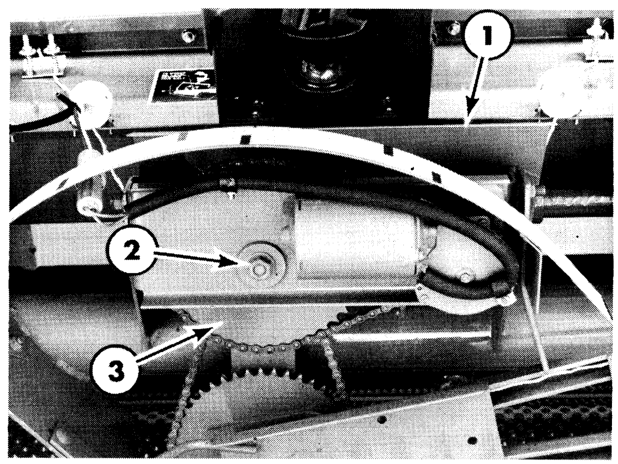


Figure 11-8

A4117-5

Remove the cotter pin at 1. The twine arm and driven sprocket assembly can now be removed from the baler.

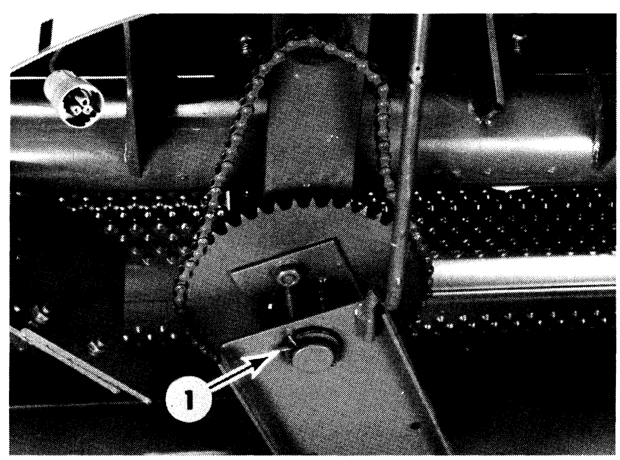


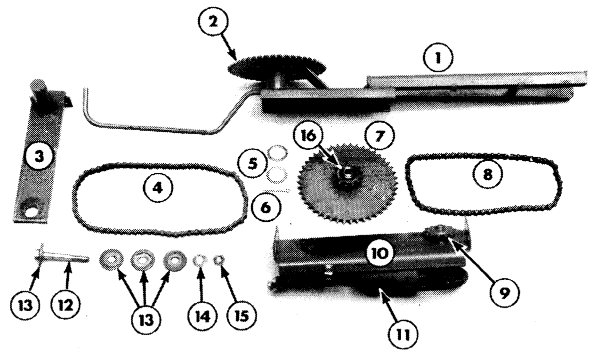
Figure 11-9

2758-12

INSPECTION

The components which make up the wrapper drive are:

1 Twine arm weld assembly
2 Sprocket, 46T
3 Support bar
4 Roll chain, RC41-96 pitches
5 Washer
6 Cotter pin
7 Double sprocket
8 Roll chain, RC41-59 pitches
9 Sprocket - motor drive
10 Channel
11 Electric motor assembly
12 M12 x 90 cap screw
13 Washers (4)
14 Washer
15 M12 nut
16 Spacer - not shown



2758-9

Figure 11-10

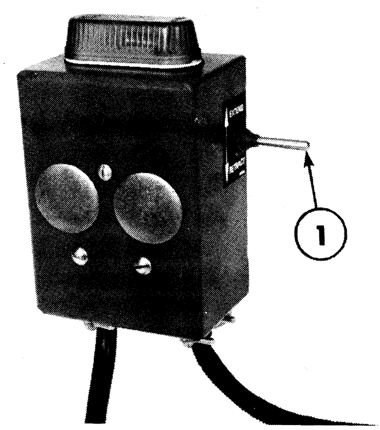
Inspect all worn and damaged components. Replace any item that appears to be questionable.

Installation

To install, proceed in reverse order of the removal sequence. See the previous "Adjustments" section for drive chain tensioning and wrapper arm clearance.

ELECTRICAL CONTROL BOX

The control box is used to inform the operator when a full bale is reached. At that time, the operator would stop forward travel. Using switch, 1, extend the twine arm to start the wrapping process.



A2765-2

Figure 11-11

The control box contains an "on-off" power switch, 1; extend-retract switch, 2; full bale alarm light, 3; and horn, 4. A 20-amp circuit breaker, 5, is also in the box to protect the harness to the motor and full bale switch. A 25-amp breaker should be located at the power source to protect the harness to the control box.

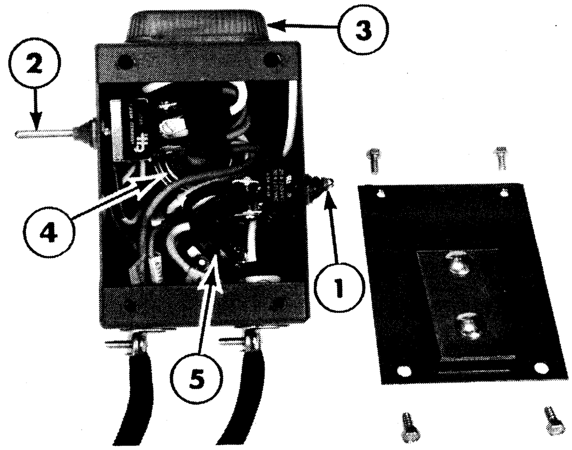


Figure 11-12

A2765-1

The full bale alarm switch is located behind the right-hand shield at 1, Figure 11-13. The switch, Figure 11-14, is closed, completing the circuit by the bale size pointer, 2, Figure 11-13.

By loosening the wing nuts at 1, Figure 11-13, the switch assembly is adjustable to signal a smaller size bale.

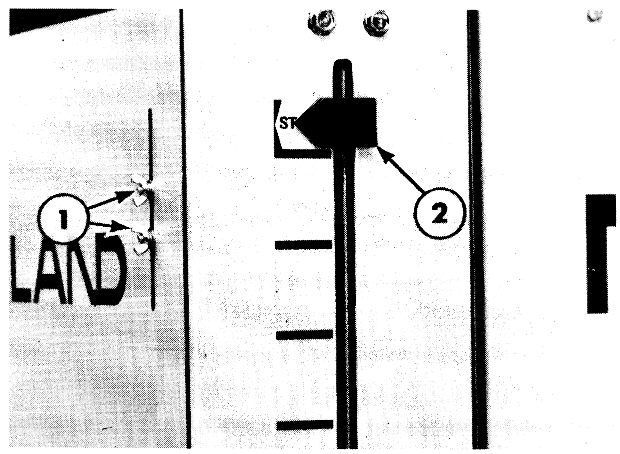


Figure 11-13

9222-6

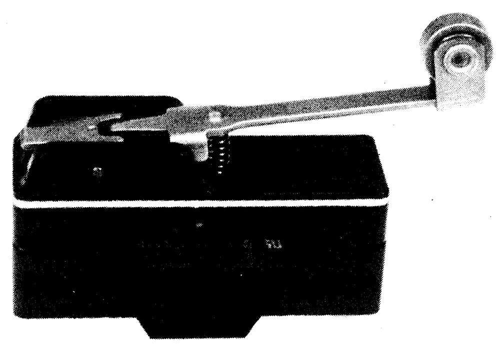


Figure 11-14

A2765-4

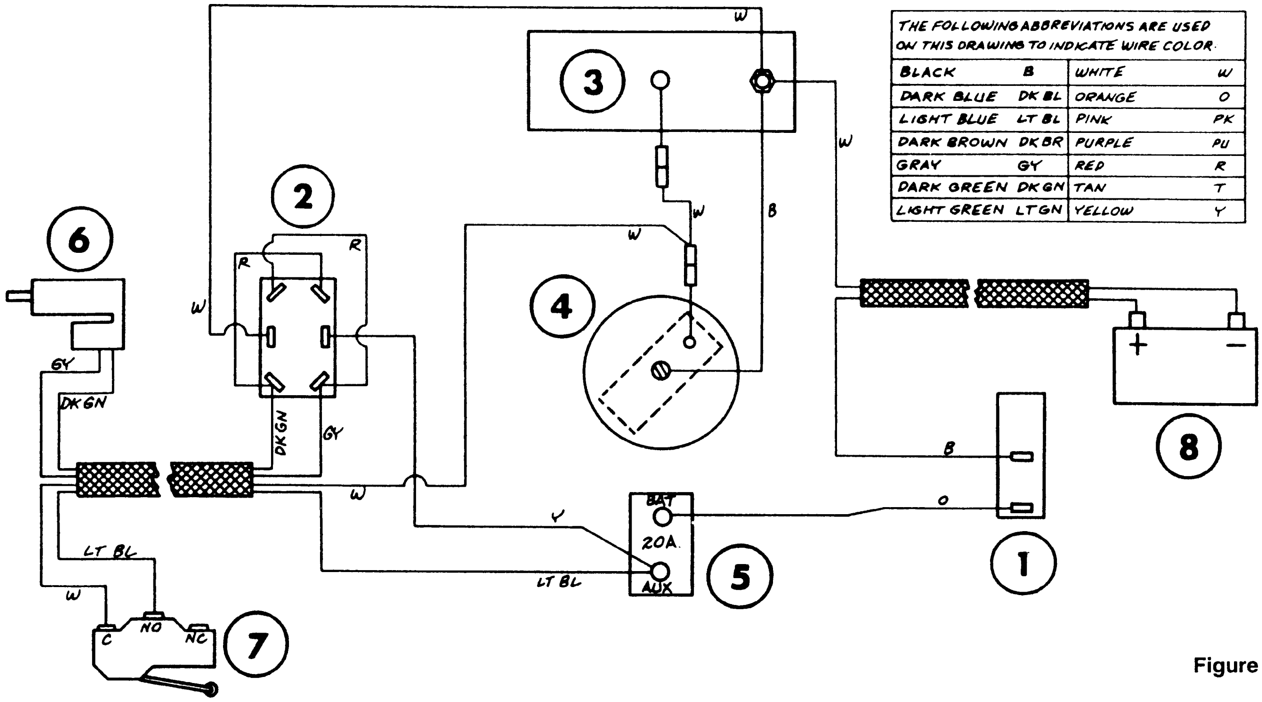


Figure 11-15

Figure 11-15 is an electrical diagram of the control box, plus full bale alarm. The diagram and a 12-volt test light can be used to troubleshoot the system.

1 Power switch
2 Extend/retract switch
3 Full bale light
4 Horn
5 Circuit breaker, 20-amp
6 Wrapper motor
7 Full bale switch
8 12-volt power source

The following abbreviations are used on this drawing to indicate wire color:

Black	B	White	W
Dark Blue	DK BL	Orange	O
Light Blue	LT BL	Pink	PK
Dark Brown	DK BR	Purple	PU
Gray	GY	Red	R
Dark Green	DK GN	Tan	T
Light Green	LT GN	Yellow	Y

LABOR GUIDE

	HOURS
Alarm - R&R	0.75
Control Box Switch - R&R	0.75
Knife Assembly - R&R	0.20
Knife Control - R&R	0.75
Microswitch - R&R	0.20
Motor - R&R	0.50
Power Switch - R&R	0.75
Twine Tube Drive - R&R	1.25

INDEX

SECTION 12

AUTO-WRAP TWINE SYSTEM MODELS 644, 654, AND 664

This section of the manual covers the Auto-Wrap twine wrapper. Refer to Sections 13 and 14 for the Bale Command Plus system.

There are several styles of trip linkage for the Auto-Wrap system that are shown in this manual. However, the Auto-Wrap system operates the same for all types of trip systems.

TWINE WRAPPING CYCLE OPERATION

The twine wrapper used on the Auto-Wrap machines is the same as the twine system on the Bale Command Plus machines, except that the twine tubes are operated by a cam follower and worm gears instead of the electric actuator used on the Bale Command Plus machines.

When the Auto-Wrap is tripped, a roller on the bottom of the trip cam, 1, releases the knife operating slide, 2, to open the twine knives and also releases the clutch pawl, 3.

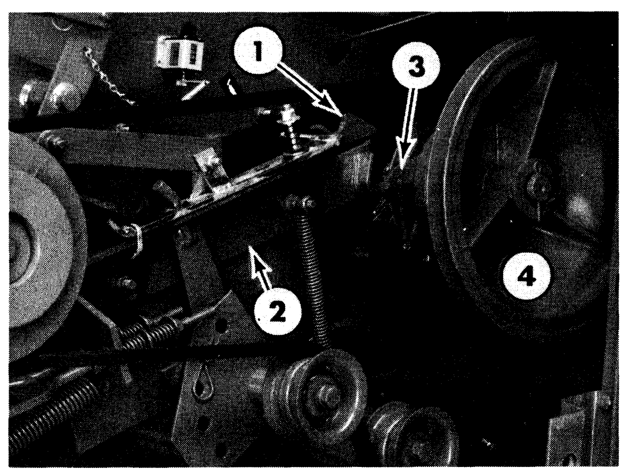


Figure 12-1

A4399-9

When the clutch roller is engaged by the latch block in the drive sheave, 4, Figure 12-2, a worm gear moves the cam, 5, and allows the twine tubes, 6, Figure 12-3, to drop to the twine start position as shown in Figure 12-3. As the cam rotates, a cam follower moves the drag link, 7, Figure 12-2, and the twine tubes pivot toward the outside of the baler to position the twine on the bale. As the twine tubes reach the home position, the roller on the trip cam contacts the knife operating slide to close the knives to cut and hold the twine as shown in Figure 12-4, and at the same time moves the slide so it is contacted by the clutch pawl, 3, Figure 12-1, and disengages the clutch.

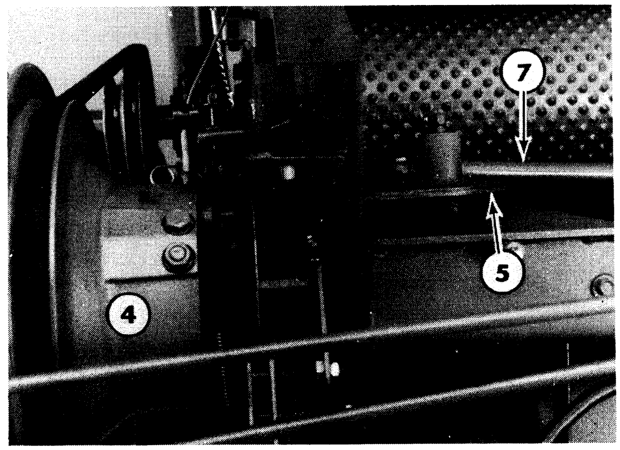


Figure 12-2

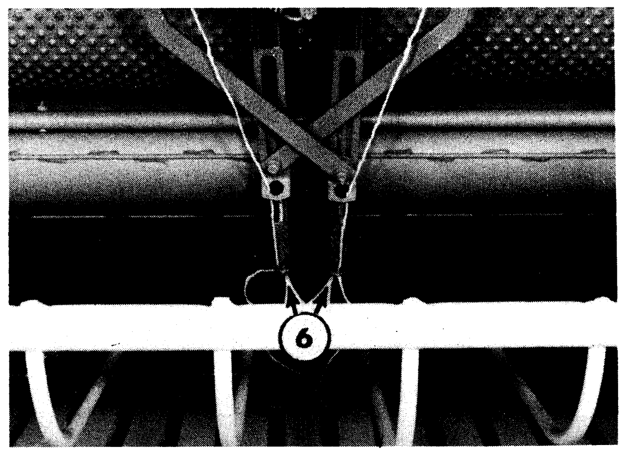


Figure 12-3

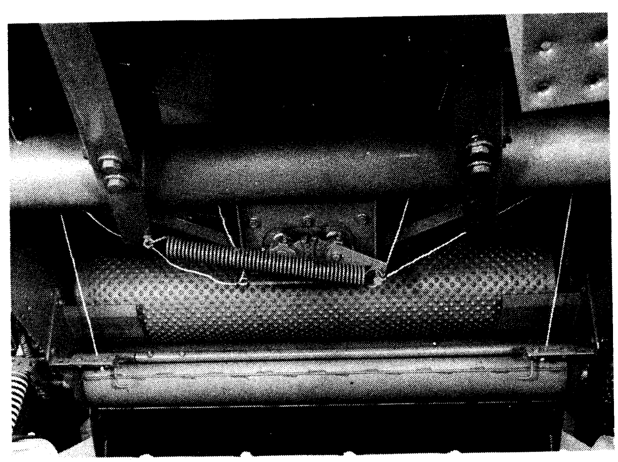


Figure 12-4

TWINE WRAPPER ADJUSTMENTS

CLUTCH STOP

When the clutch is in the disengaged position as shown in Figure 12-5, the clutch pawl, 1, should overlap the stop, 2, by 1/8″ to 1/4″ (3 mm to 6 mm). When the Auto-Wrap trips, the stop moves forward slightly. If there is too much overlap between the stop and pawl, it will require excessive force to trip the system.

To adjust the stop:

Remove the drive belt and sheave, 3.

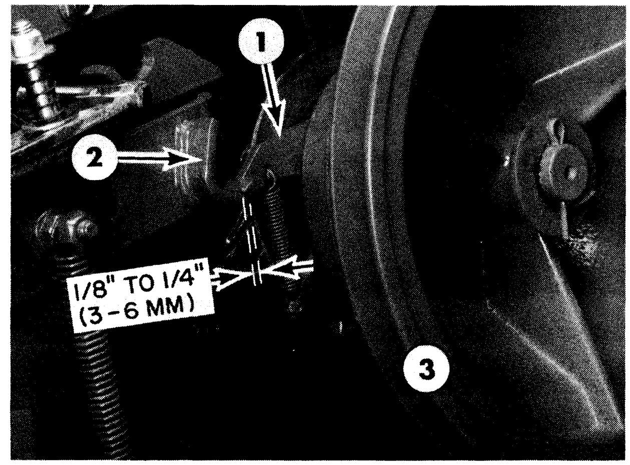


Figure 12-5

A4399-16

Grasp the clutch, 4, Figure 12- 6, and rotate it clockwise approximately 1″ (25 mm).

Pull the clutch to the right just far enough to remove it from the splines on the shaft, 5; rotate the clutch one spline and reinstall it on the shaft. Be sure the clutch brake, 6, is on the mounting pins, 7.

Reinstall the sheave by holding the pawl, 1, Figure 12-5, up so the roller will go inside the sheave. Do not install the sheave retaining hardware or belt until the adjustment is checked.

Rotate the sheave counterclockwise until the pawl contacts the stop, 2, and is no longer driven by the sheave.

Check the overlap between the stop and pawl. If it is not between 1/8″ and 1/4″ (3 mm and 6 mm) repeat the adjustment procedure.

When the adjustment is correct, reinstall the sheave retaining washers and cotter pin and the drive belt.

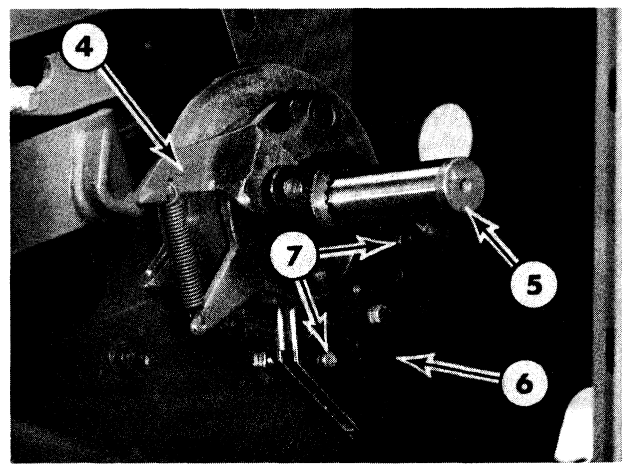


Figure 12-6

A4399-14

CLUTCH BRAKE

There must be tension on the brake disc to provide a constant load on the sheave and drive belt during the wrap cycle.

Tighten the spring tension bolt, 1, two turns after the nut contacts the spring, 2.

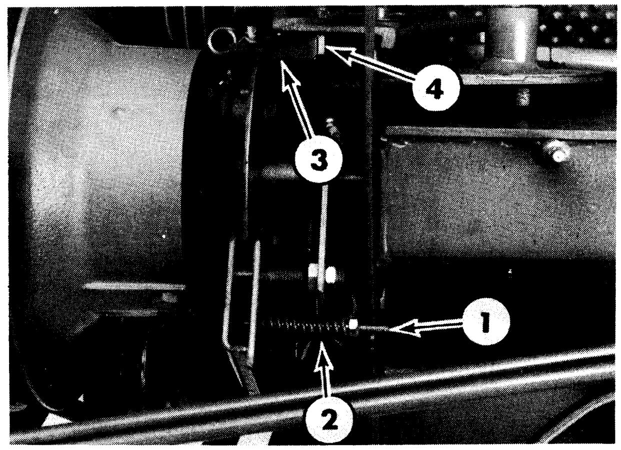


Figure 12-7

KNIFE OPERATING SLIDE (STOP PLATE) AND ROLLER

The inside edge of the knife operating slide (stop plate) tab, 3, should be at, or slightly to the inside of, the center of roller, 4.

If the adjustment is not correct, the mounting plate for either the slide assembly or the worm gear can be shimmed to provide the correct overlap.

If there is not enough overlap, the slide may slip off the roller and not disengage the clutch, allowing the wrap cycle to restart.

If there is too much overlap, the clutch may be difficult to trip.

The slide must move freely so the knives open before the twine tubes drop.

TRIP SLIDE

The trip slide, 1, must move freely to trip the clutch and also to reset properly.

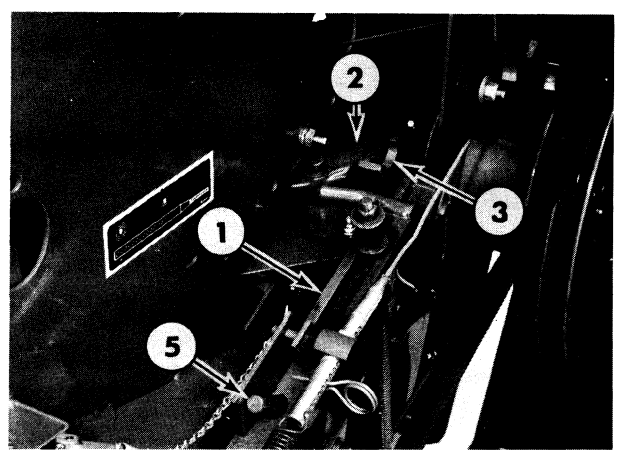


Figure 12-8

As the bale reaches the selected size, the slide moves trip, 2, to release the clutch. As the cam and trip plate rotate back to the home position, the slide engages in the notch in the trip at 3. With the slide in this notch, the clutch can be tripped manually by moving handle, 4, down to repeat the wrap cycle. When the handle is used to trip the Auto-Wrap, pin, 5, moves the slide forward to trip the clutch. When the bale is ejected, the slide is moved to the rear of the trip and is ready for the next bale.

The slide should not contact the side or bottom of the trip.

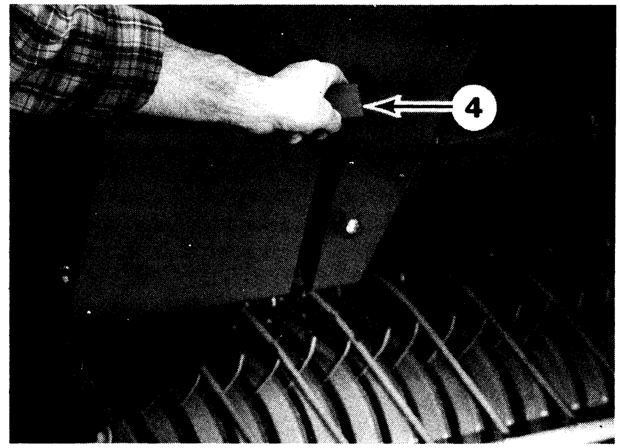


Figure 12-9

TWINE KNIFE TENSION

The twine knives operate independent of each other. The left knife is operated by spring-loaded rod, 1. The right knife is operated by spring loaded rod, 2. If the knife supports are "frozen" together, one side may not cut the twine as the knife will not be pulled against the striker plate.

To adjust the knife tension:

Be sure the clutch is disengaged and the twine tubes are in the home position.

Adjust the nuts on the knife actuating rods, 1 and 2, to compress the springs, 3, to a total length of 2-1/2″ (64 mm). Adjust the nuts, 4, so there is a gap of 1/8″ (3.5 mm) between the washer and the tab.

NOTE: If the washers between nuts, 4, and the slide are against the slide with the actuator retracted, the twine may not be cut as the springs, 3, cannot pull the knives tight against the striker plates.

When using some types of twine it may be necessary to increase the tension on the knives by compressing the springs, 3, to less than 2-1/2″ (64 mm). Before compressing the springs to less than 2-1/8″ (54 mm), check to be sure that the knives are sharp and make full contact with the striker plates.

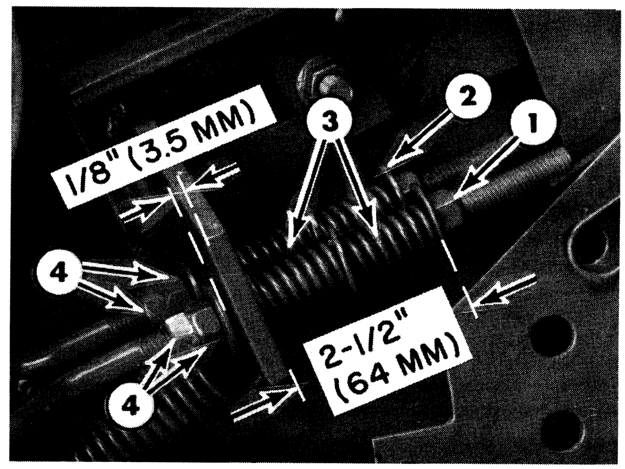


Figure 12-10

A4399-15

TWINE TUBES

Adjust the twine tubes so there is a gap of approximately 2″ - 3″ (51 mm - 76 mm) between the ends of the twine tubes when they are in the "twine start" position as shown in Figure 12-11.

To adjust the twine tubes:

Trip the Auto-Wrap manually and turn the sheave until the twine tubes drop to the "twine start" position.

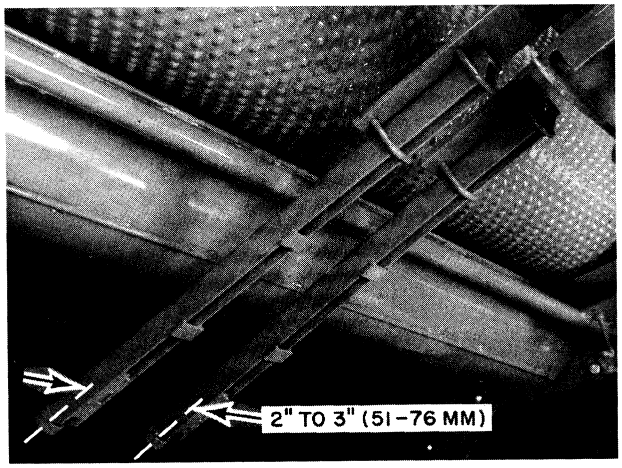


Figure 12-11

A4622-6

Loosen the jam nuts, 1, at each end of the drag link.

Rotate the drag link tube, 2, to obtain a gap of 2″ (52 mm) between the ends of the twine tubes.

Return the twine tubes to the home position and check for interference between the ends of the tubes and the frame. Readjust the tube to obtain clearance if required.

Tighten the jam nuts, 1.

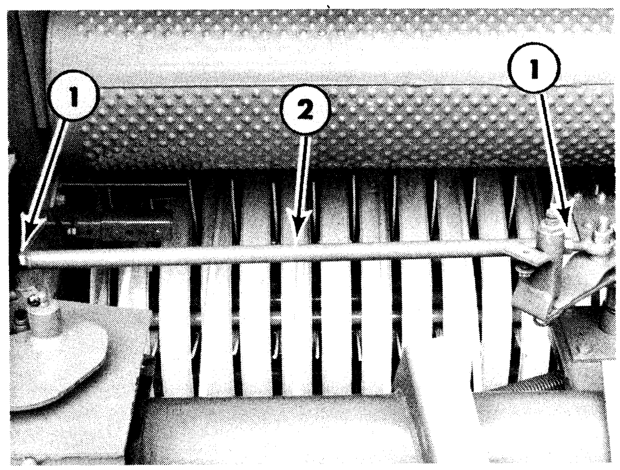


Figure 12-12

A4621-7

After the drag link is adjusted, check the clearance between the eccentric collar, 3, and the breakaway arm, 4. If the clearance is not between 1/64″ and 1/32″ (0.4 mm and 1.6 mm), loosen the setscrew, 5, in the collar and rotate the collar to adjust the clearance and then tighten the setscrew. If the clearance is too great, it may be difficult to reset the breakaway.

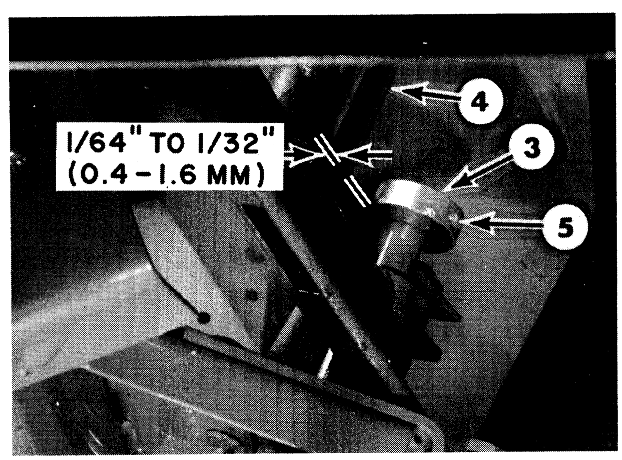


Figure 12-13

TWINE TUBE BREAKAWAY

The breakaway system should be adjusted so that a pull of 105 pounds (467 N) at the end of the twine tube is required to disengage the breakaway as shown in Figure 12-14. To reset the breakaway, grasp one of the twine tubes and pull toward the home position. The two halves of the breakaway should snap together as shown in Figure 12-15. The breakaway is held in the normal operating position by a spring-loaded ball inside the arm, 1, Figure 12-14, attached to the twine tube pivot shaft. The ball seats in arm, 2, attached to the drag link.

To adjust the breakaway force:

Loosen the jam nut, 3, Figure 12-15.

Turn screw, 4, clockwise to increase the breakaway force or counterclockwise to reduce the force. One rotation of the screw will change the breakaway force by 12 lbs. - 13 lbs. (53 N - 58 N).

When the setting is correct, tighten the jam nut, 3.

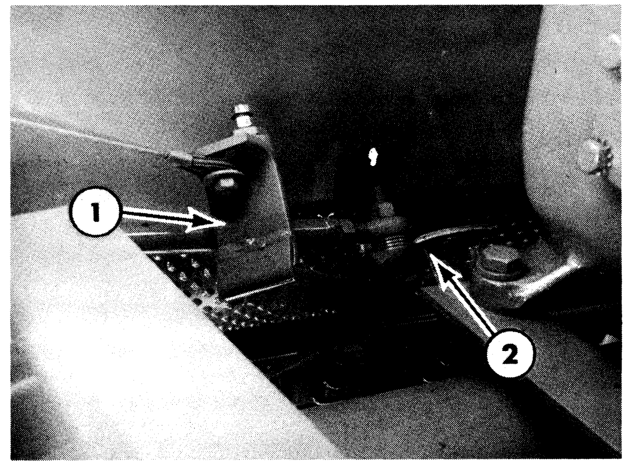


Figure 12-14

3983-8

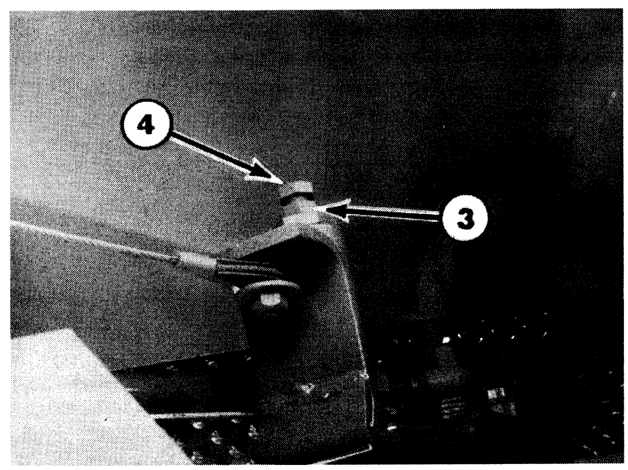


Figure 12-15

3983-1

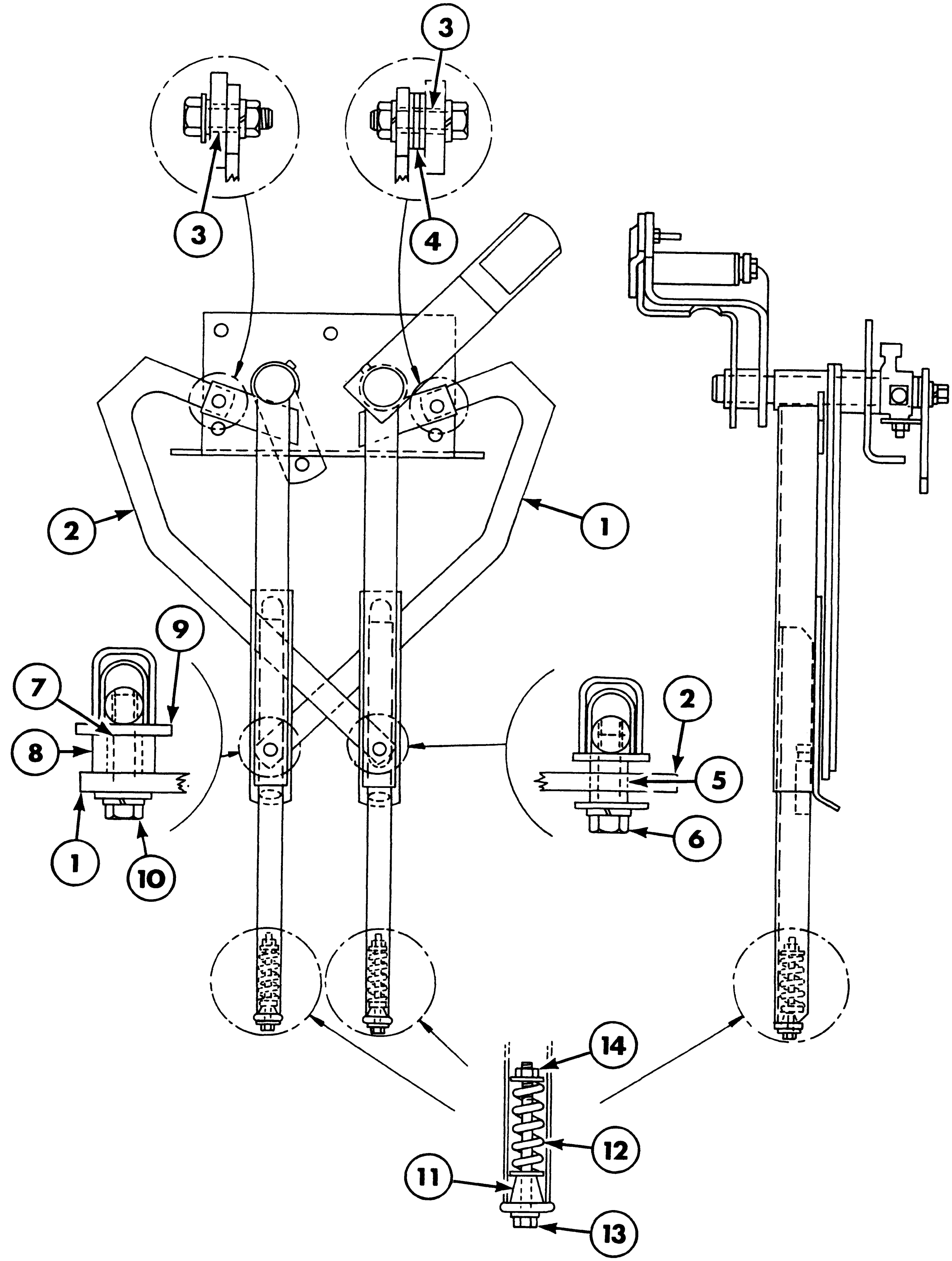


Figure 12-16

EXTENDABLE TWINE TUBES - MODELS 644 AND 654

The extendable twine tubes slide in the twine tubes when the tube assembly is moved through its cycle. The tubes must be installed as shown in Figure 12-16 to be sure that they can move freely. The right-hand link, 1, must be below the left-hand link, 2. The links are attached to the tube and shaft weld assemblies as shown using 5/16″ (8 mm) long spacers, 3, and washers, 4, to position them. The left link is attached to the right telescoping tube using a 17/32″ (13.5 mm) long spacer, 5, and a M8 x 30 cap screw, flat washer and lock washer at 6. The right link is attached to the left telescoping tube using a 1-1/32″ (26.2 mm) long spacer, 7; a 3/8″ (9.5 mm) long spacer, 8; a washer, 9; and a M8 x 40 cap screw, lock washer and washer at 10.

TWINE TUBE "BULLETS"

There are spring-loaded "bullets," 11, Figure 12-16, in the end of the Models 644 and 654 extendable twine tubes and in the Model 664 twine tubes. They hold the twine in the tube when the tubes return to the home position after the twine is cut and prevent the twine from coming out of the tubes until they drop to the start position.

The bullet, 11, seats against a ring in the end of the tube. Spring, 12, is installed inside the tube. The bullet and spring are held together by a 1/4″ x 4″ cap screw, 13, and a locknut, 14. Tighten the locknut until 2 or 3 threads are completely through the nut.

TWINE TUBES, MODEL 664

The twine tube, 1, is attached to the bracket using two U-bolts, 2. The end of the tube should extend through the upper U-bolt by 3/4″ (19 mm).

The "bullets" should be adjusted the same as the Models 644 and 654.

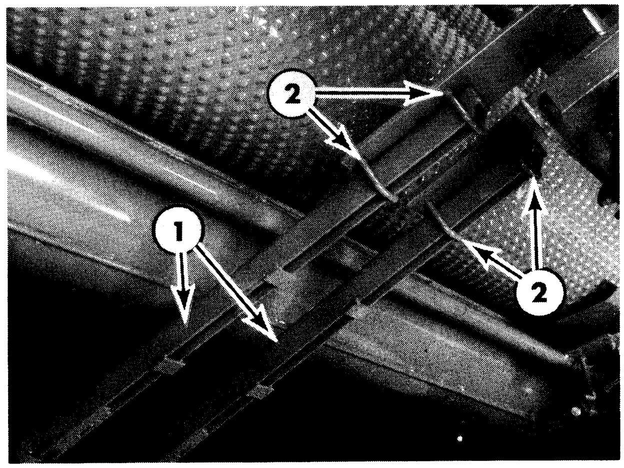


Figure 12-17

A4622-6

TWINE TUBE BRACKET AND PIVOT ASSEMBLY

The Models 644 and 654 extendable twine tubes, 1, Figure 12-18, and the Model 664 twine tubes, 1, Figure 12-21, are attached to brackets, 2, Figure 12-19 (Model 664 Shown) welded to pivoting shafts.

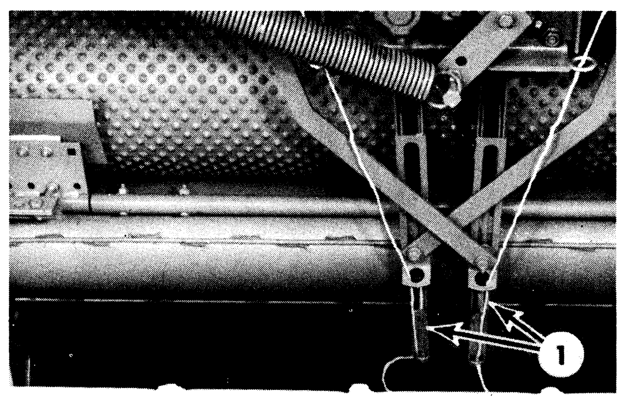


Figure 12-18

The right-hand tube is controlled by the drag link, 3, connected to a cam follower bracket and shaft, 4, Figure 12-20, that follows cam, 5, which is driven by the worm gear, 6.

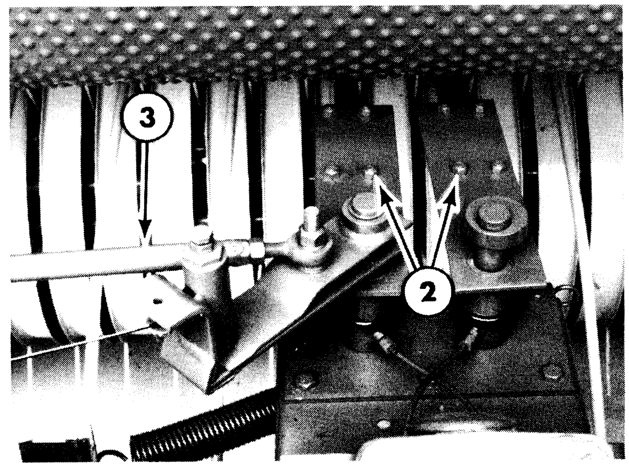


Figure 12-19

A4621-6

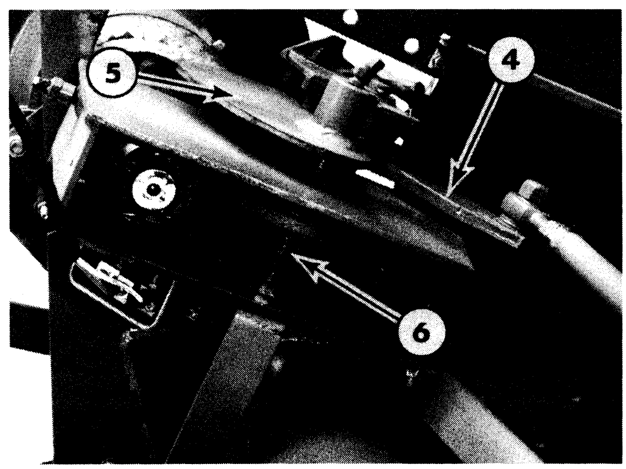


Figure 12-20

A4621-5

The left tube is controlled by gears, 7, attached to the bottom of the twine tube pivot shafts.

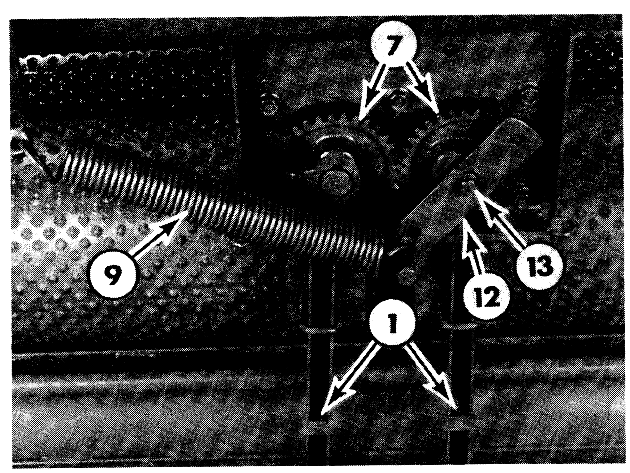


Figure 12-21

A4622-5

Disassembly - Model 664 shown, the Models 644 and 654 are similar

Grab the end of one of the twine tubes and give it a quick pull to separate the breakaway as shown in Figure 12-22. This will make it easier to remove the breakaway from the shaft bracket.

Remove the indicator cable, 8, from the bolt on the breakaway bracket.

Remove the twine tubes, 1, Figure 12-21, from the brackets.

Remove the spring, 9, from the left gear.

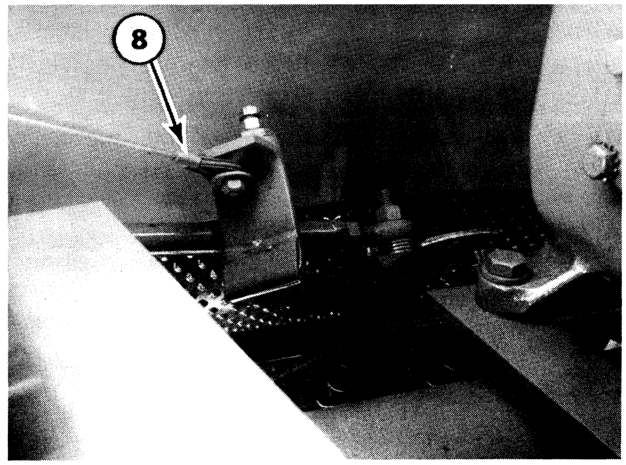


Figure 12-22

A3983-8

Disconnect the drag link by removing the nut from the carriage bolt at 10, Figure 12-23.

The pivot assembly can be disassembled when it is mounted on the baler as described below, or the complete assembly can be removed as a unit by disconnecting the drag link, indicator cable, and spring as described above and then removing grease lines and the five cap screws securing the mounting plate, 11, to the baler. If the complete assembly is removed, follow the same procedures to disassemble it.

Remove the gears, 7, Figure 12-21, and spring bracket, 12, from the bottom of the shafts by removing the four setscrews and the center bolt, 13. Remove the woodruff keys from the shafts.

Remove the eccentric, 14, Figure 12-23, by loosening the setscrew.

Lift the shaft and bracket assemblies out of the mounting bracket.

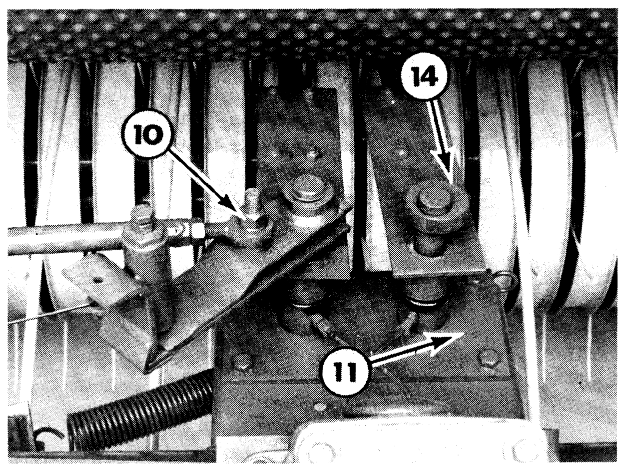


Figure 12-23

A4621-6

The parts removed from the mount are shown in Figure 12-24. The breakaway is shown engaged.

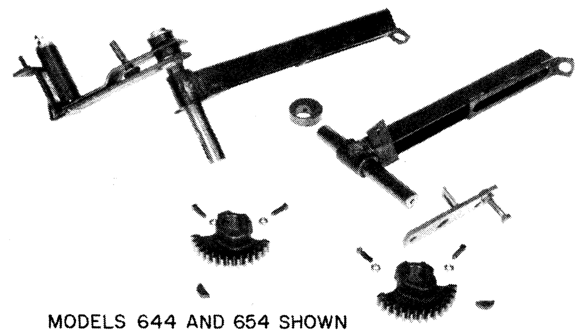


Figure 12-24

A4622-2

Remove the breakaway, 1, from the shaft and bracket weld assembly, 2, by removing the snap ring, 3, and any washers that may be on the shaft. If the breakaway was not separated as shown in Figure 12-22, it will be necessary to loosen adjusting bolt, 4, to pivot the breakaway to the side.

The breakaway is held in the operating position by a spring-loaded ball, 5. To remove the spring, 6, or ball, remove the adjusting bolt cap, 7, and spacer, 8.

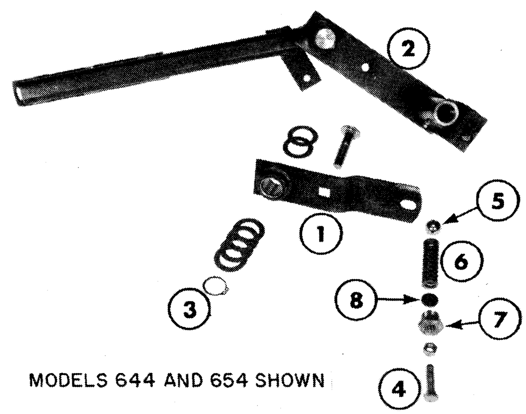


Figure 12-25

A4622-8

Remove the grease lines from the fittings, 15.

Remove the five cap screws from the mounting plate, 11, and remove the plate.

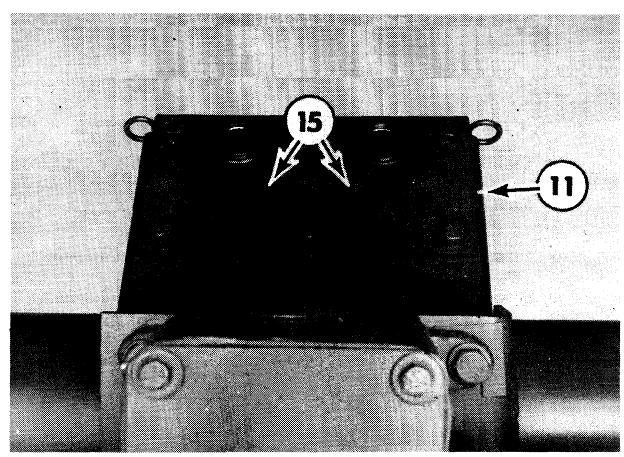


Figure 12-26

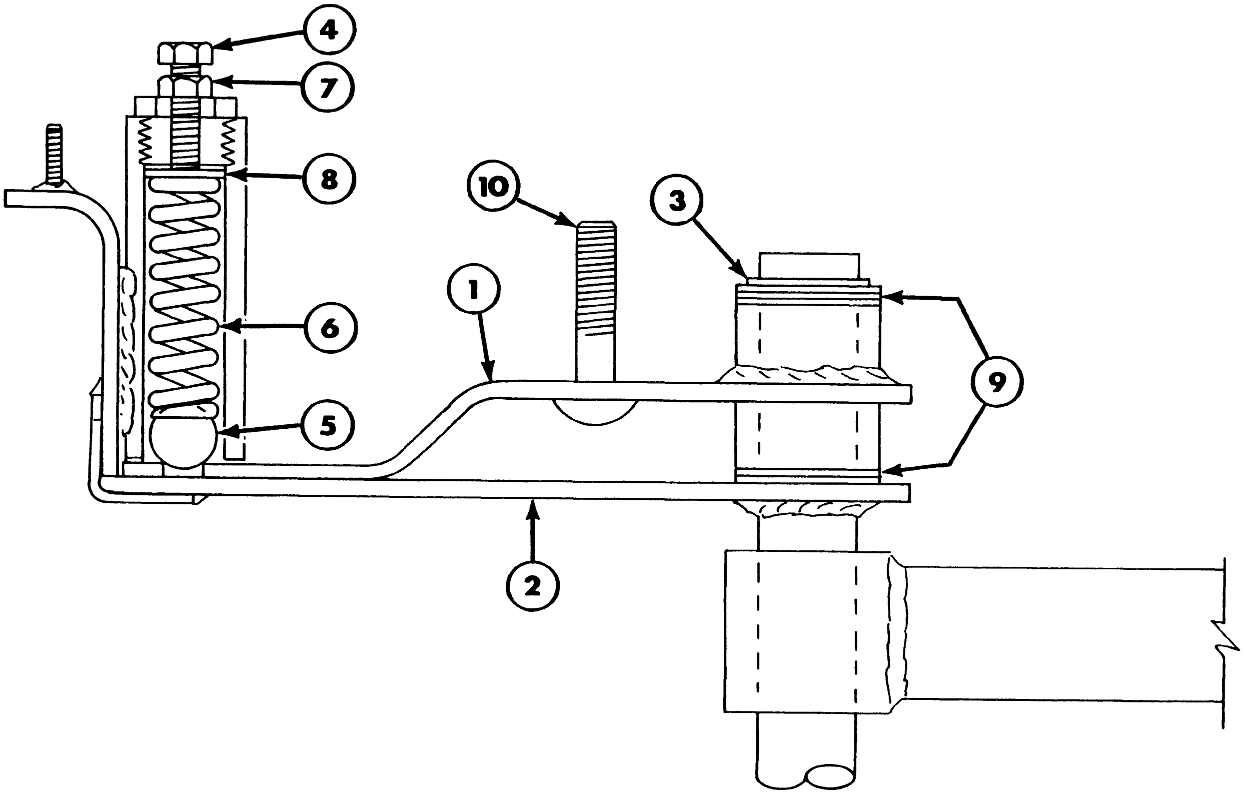


Figure 12-27

Assembly- Models 644 and 654 shown, the Model 664 is similar

If the mounting bracket has been removed from the baler, the pivot assembly can be assembled on the bench following the same instructions listed below and then installed as a unit.

Place the ball, 5; spring, 6; and spacer, 8, in the tube on the bracket and shaft weld assembly, 2.

Install the cap, 7.

Place a jam nut on the adjusting bolt, 4, and install in the cap. Do not tighten the adjusting bolt; it should be adjusted after the pivot assembly is completely reassembled and installed in the baler.

Place a 1/2″ x 2-1/4″ short square neck bolt, 10, through the breakaway. Install a nut on the end of the bolt to hold it in place until the assembly is installed on the baler and the drag link reconnected.

Place the breakaway, 1, on the shaft. Pivot the breakaway so it engages under the spring-loaded ball. The breakaway should lightly contact the top of the bracket or have up to 0.030″ (8 mm) clearance with the top. Use washers, 9, to adjust the breakaway height.

Use washers, 9, above the breakaway to reduce end play of the breakaway on the shaft to less than 0.030″ (8 mm) with snap ring, 3, installed.

Install the mounting bracket, 11, Figure 12-26, on the baler using five M10 x 20 cap screws and flanged nuts.

Attach the grease lines to the fittings, 15, on the mounting bracket hubs.

Install the shaft and breakaway assembly in the right hub in the mount and the left bracket and shaft in the left hub.

Position the twine tube brackets so they are parallel to each other. Install the keys in the shafts and install the gears, 7, as shown. Position the gears on the shaft so they are within 0.030″ (0.8 mm) of the bottom of the mounting bracket when the shaft and bracket is against the top. Do not force the gears against the bracket as the shafts may not pivot freely. Install two 5/16″ x 1″ setscrews and jam nuts in the left gear. Install the spring bracket, 12, as shown using an M8 x 20 cap screw, 13, washer and lock washer and a 5/16″ x 1-1/4″ setscrew and jam nut. Install a 5/16″ x 1″ setscrew in the right gear.

Install the twine tubes. Refer to the twine tube information earlier in this section.

Install the spring, 9.

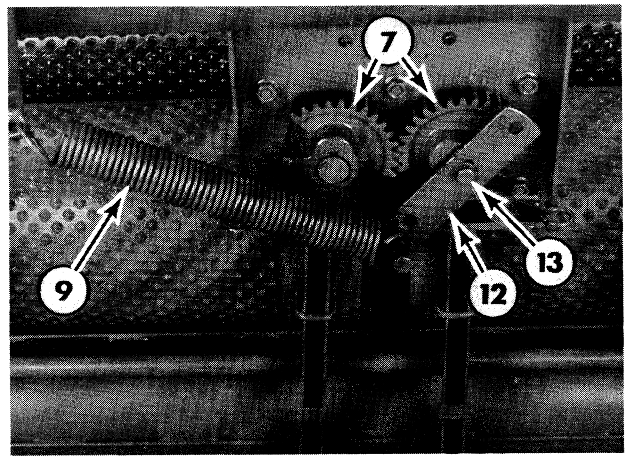


Figure 12-28

A4622-5

Attach the drag link to the breakaway with three 1/2″ washers between the breakaway and rod end and install a locknut on the carriage bolt installed through the breakaway at 10.

Attach the indicator cable, 8, to the bracket using a washer and locknut at 16.

Place the eccentric, 14, on the left pivot shaft. Rotate the eccentric to obtain a clearance of 1/64″ to 1/32″ (0.4 mm to 1.6 mm) between the eccentric and breakaway arm when in the home position. Tighten the setscrew.

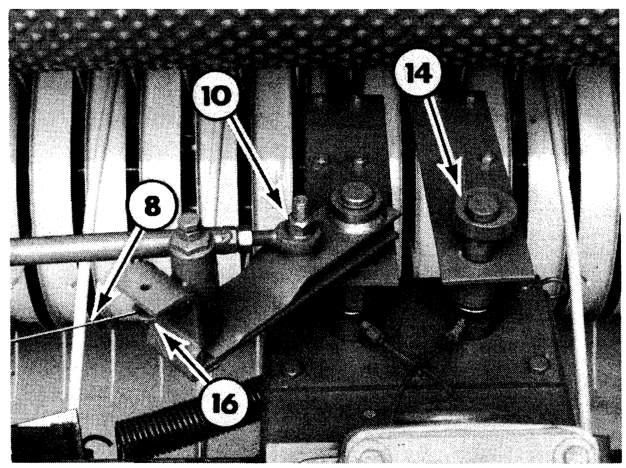


Figure 12-29

A4621-6

REPLACING THE BREAKAWAY

Grab the end of one of the twine tubes and give it a quick pull to separate the breakaway as shown in Figure 12-22. This will make it easier to separate the breakaway from the shaft bracket.

Disassembly

Disconnect the drag link by removing the nut from the carriage bolt at 10, Figure 12-29.

Remove the breakaway, 1, from the shaft and bracket weld assembly, 2, by removing the snap ring, 3, and any washers that may be on the shaft. If the breakaway was not separated as shown in Figure 12-22, it will be necessary to loosen adjusting bolt, 4, to pivot the breakaway to the side.

The breakaway is held in the operating position by a spring-loaded ball, 5. To remove the spring, 6, or ball, remove the adjusting bolt cap, 7, and spacer, 8.

Assembly

Place the ball, 5, Figure 12-27, spring, 6, and spacer, 8, in the tube on the bracket and shaft weld assembly, 2.

Install the cap, 7.

Place a jam nut on the adjusting bolt, 4, and install in the cap. Do not tighten the adjusting bolt; it should be adjusted after the breakaway assembly is completely reassembled and installed on the baler.

Place a 1/2″ x 2-1/4″ short square neck bolt, 10, through the breakaway. Install a nut on the end of the bolt to hold it in place until the assembly is installed on the baler and the drag link reconnected.

Place the breakaway, 1, on the shaft. Pivot the breakaway so it engages under the spring-loaded ball. The breakaway should lightly contact the top of the bracket or have up to 0.030″ (8 mm) clearance with the top. Use washers, 9, to adjust the breakaway height.

Use washers, 9, above the breakaway to reduce end play of the breakaway on the shaft to less than 0.030″ (8 mm) with snap ring, 3, installed.

Attach the drag link to the breakaway with three 1/2″ washers between the breakaway and rod end and install a locknut on the carriage bolt installed through the breakaway at 10, Figure 12-29.

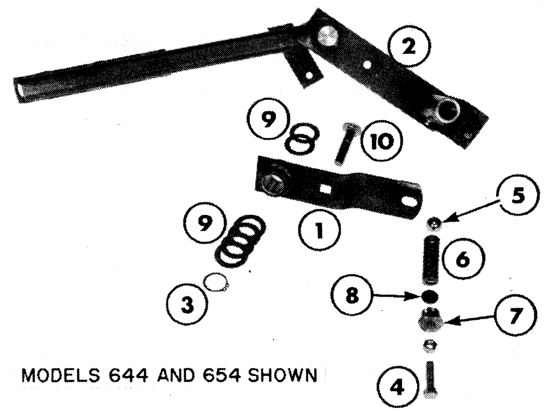


Figure 12-30

A4622-8

TWINE KNIVES AND SUPPORTS

The twine knives, 1, Figures 12-31 and 12-32, are held to the supports using two carriage bolts, 2, and flanged nuts. The knives must be kept sharp and make contact with the striker plates, 3, for their full length. The right knife support, 4, Figure 12-31, and the left knife support, 5, Figure 12-32, must pivot freely and independent of each other to cut and hold each twine.

The left knife support, 5, Figure 12-32, is operated by a shaft, 6, Figure 12-31, that goes through the right support, 4, and is connected to the outer knife operating rod, 7, Figure 12-34. The right support is connected to the inner knife operating rod, 8, by a clamp, 9, on the support.

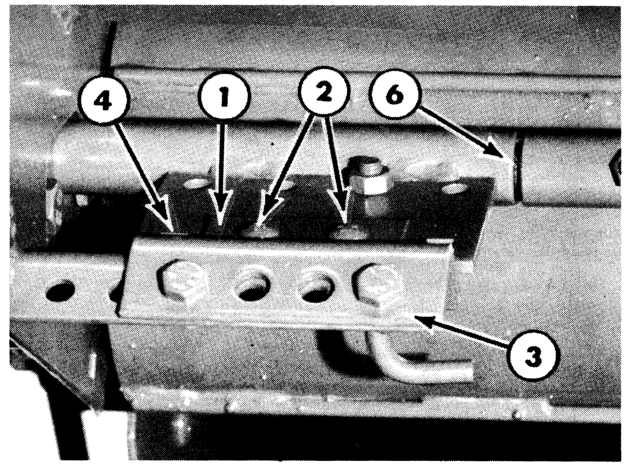


Figure 12-31

A4600-3

Replacing a knife

To replace a knife, 1, Figures 12-31 and 12-32, remove the flanged nuts from the two carriage bolts, 2, and remove the knife.

Place the new knife (or other edge of the original knife), 1, with the bevel down toward the striker plate, 3, and install the two carriage bolts, 2. Start the two flanged nuts on the carriage bolts but do not tighten completely. Position the knife so it makes contact with the striker plate for the full length of the knife and tighten the flanged nuts. If the knife cannot be moved enough to fully contact the striker plate, 3, loosen the striker plate hardware and reposition the striker plate.

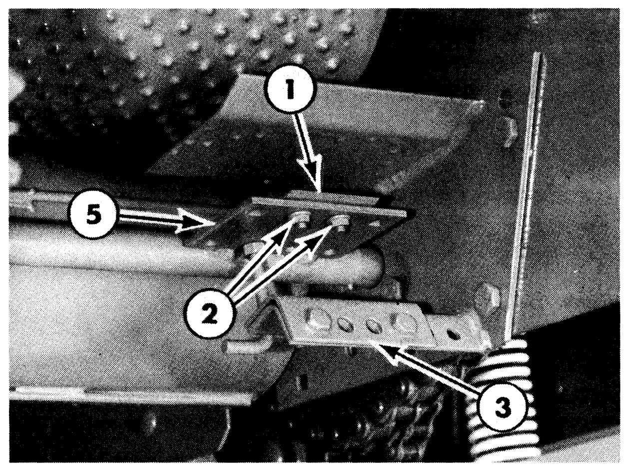


Figure 12-32

A4600-2

Sharpening a knife

The twine knife has two sharpened cutting edges. When one edge is dull, the knife can be reversed to use the second edge following the instructions to replace a knife.

When both edges are dull, the knife can be sharpened using a file or grinder. Be sure to maintain the original bevel angle as shown when sharpening the knife. The sharpened edge must also be straight to ensure that the knife will cut for the full length.

Replace the knife supports and bearings

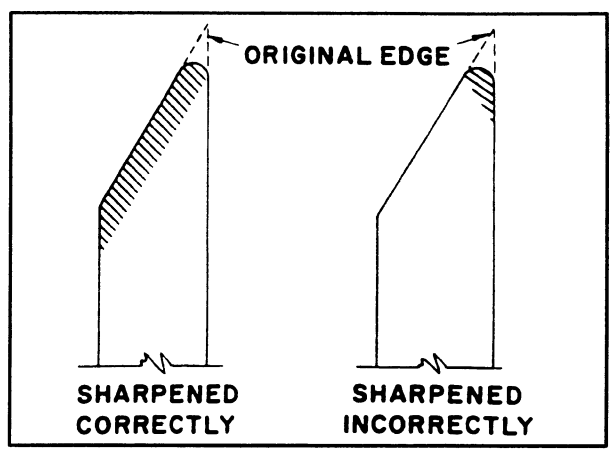


Figure 12-33

Disassembly

Disconnect the knife operating rods, 7 and 8, by removing the cotter pins, 10, and washers from the end of the rod and then sliding the rods out of the right knife support clamp, 9, and the left operating shaft, 6.

Remove the two socket-head cap screws, 11, Figure 12-31, from the left support and operating shaft.

Pull the left operating shaft, 6, out of the supports.

Remove the bearing, 12, Figure 12-35,from the left support by removing the cotter pin through the support and two cap screws.

Remove the right support operating clamp, 9, Figure 12-34, from the support.

Remove the right support, 4, Figure 12-31, by sliding it toward the center of the baler.

Remove the right bearing, 13, Figure 12-34.

Assembly

Attach the right bearing, 13, Figure 12-34, to the side sheet.

Place the right support, 4, Figure 12-31, through the baler side sheet and the bearing.

Place the operating clamp, 9, Figure 12-34, on the support.

Place the left support, 5, Figure 12-32, through the side sheet. Install the bearing, 12, Figure 12-35, on the support and install a cotter pin through the support.

Place a washer on the left operating shaft, 6, Figure 12-34. Coat the shaft with an antiseize-type grease and place the shaft through the right support, 4, Figure 12-31.

Place the left support, 5, over the operating shaft and install the two socket-head cap screws, 11, and locknuts.

Attach the left bearing, 12, Figure 12-35, to the side sheet.

Align the hole for the operating rod in the clamp, 9, Figure 12-34, with the hole for the operating rod in the left operating shaft, 6, and tighten the cap screw to lock the clamp, 9, to the right support.

Place the knife operating rods, 7 and 8, through the clamp and left shaft and install a washer and cotter pin, 10, at the end of each rod.

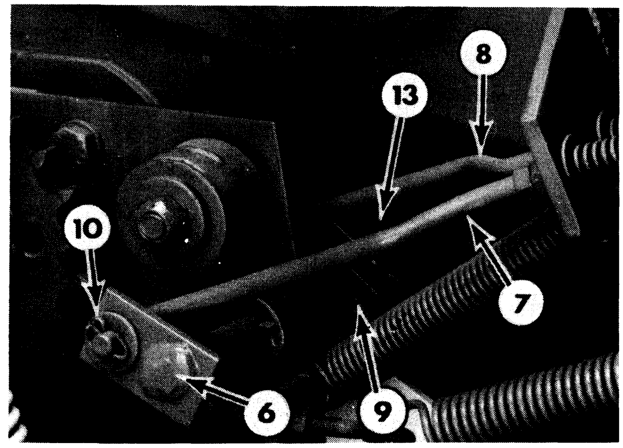


Figure 12-34

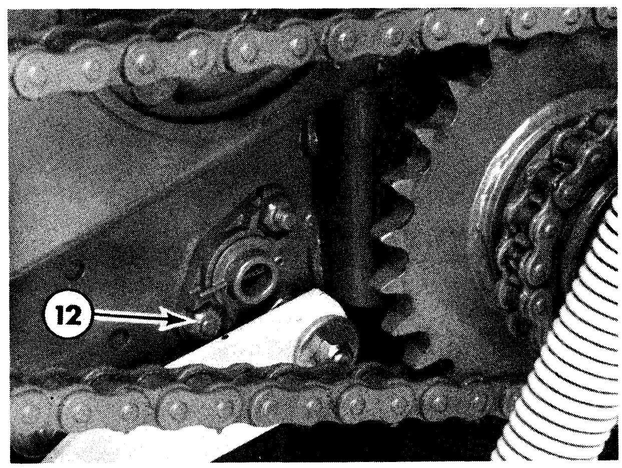


Figure 12-35

A4622-7

Return the twine tubes to the home position so the clutch is disengaged.

Adjust the nuts on the knife actuating rods to compress the springs, 14, to a total length of 2-1/2″ (64 mm). Adjust the nuts, 15, so there is a gap of 1/8″ (3.5 mm) between the washer and the tab.

NOTE: If the washers between nuts, 15, and the slide are against the slide with the Auto-Wrap in the home position, the twine may not be cut as the springs, 14, cannot pull the knives tight against the striker plates.

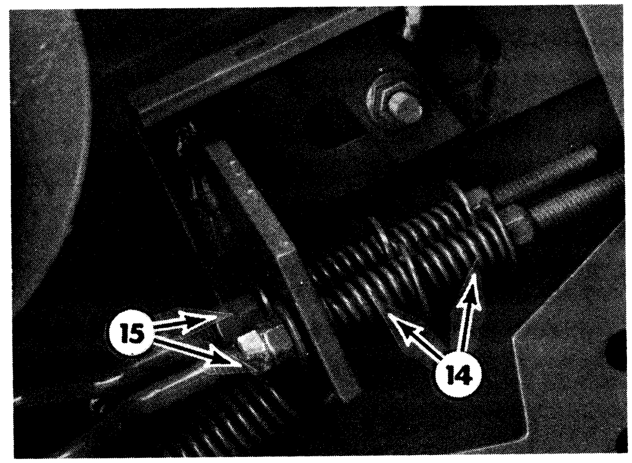


Figure 12-36

A4399-15

CLUTCH AND BRAKE ASSEMBLY

NOTE: Some of the photographs used in this section were taken with the twine box and shields removed. However, it is not necessary to remove them to replace the clutch or brake and related parts.

Disassembly

Remove the drive belt.

Remove the drive sheave, 1, and washers by removing the cotter pin, 2, in the drive shaft.

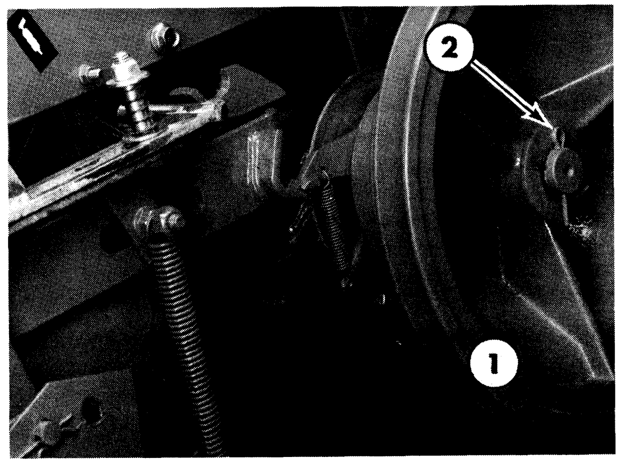


Figure 12-37

A4399-16

Pull the clutch, 3, and brake pads, 4, off the drive shaft.

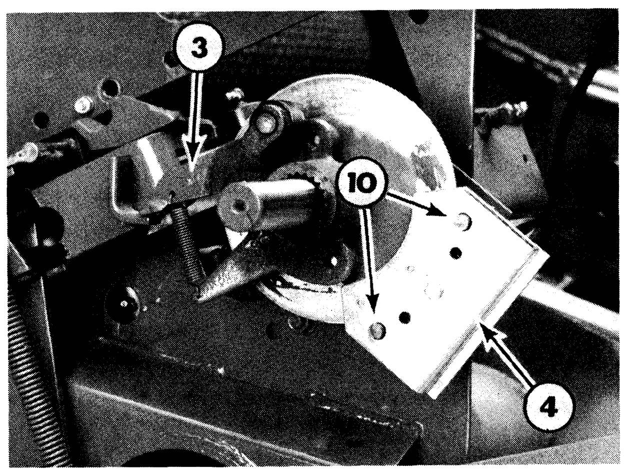


Figure 12-38

A4621-11

Loosen the spring bolt, 5, and remove the clutch brake pads, 4.

Remove the spring bolt to separate the brake pads.

Remove the brake disc, 6, from the clutch assembly.

The pawl assembly can be removed from the clutch by removing the spring, 7, and grinding the end of pin, 8, that faced the disc and then driving the pin out of the support.

Remove the latch block, 9, from the driven sheave.

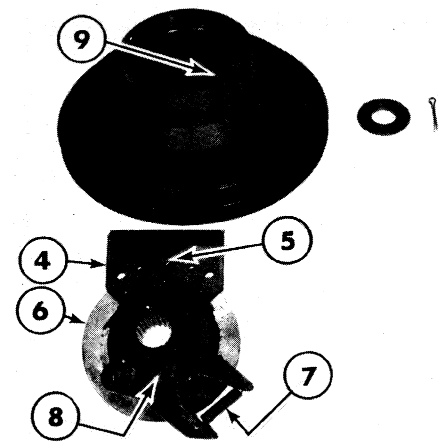


Figure 12-39

Assembly

Install the latch block, 9, in the driven sheave using a 3/8″ x 3/4″ UNF cap screw and lock washer. The latch should be against the square-headed bolt in the sheave.

Place the pawl assembly in the support; coat pin, 8, with grease and install through the support and pawl with the head of the pin facing away from the disc mounting side of the support. Peen the end of the pin facing the disc to secure it. After assembly the pawl must pivot freely.

Install the brake disc, 6, on the clutch using two 3/8″ x 3/4″ cap screws and lock washers.

Install the pawl spring, 7.

Place the inner brake pad on the studs, 10, Figure 12-38, on the housing bracket as shown in Figure 12-40.

Install the clutch assembly, 3, Figure 12-38, on the shaft.

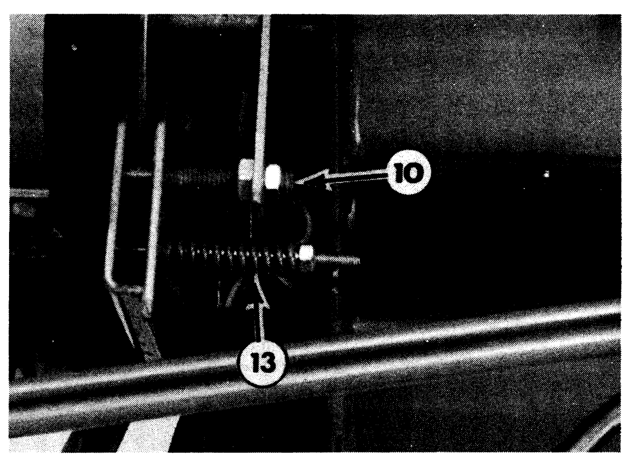


Figure 12-40

Install the drive sheave, 1, Figure 12-37, on the shaft by holding the pawl, 11, up so the roller will go inside the sheave. Do not install the sheave retaining hardware until the adjustment is checked. Turn the sheave counterclockwise until the cam reaches the home position and the clutch pawl, 11, contacts the stop, 12, on the knife operating slide and disengages the clutch. Check the overlap between the stop and pawl. When the clutch is in the disengaged position as shown in Figure 12-37, the clutch pawl, 11, should overlap the stop, 12, by 1/8″ to 1/4″ (3 mm to 6 mm). When the Auto-Wrap trips, the stop moves forward slightly. If there is too much overlap between the stop and pawl, it will require excessive force to trip the system.

To adjust the stop:

Remove the sheave.

Grasp the clutch, 3, Figure 12-38, and rotate it clockwise approximately 1″ (25 mm).

Pull the clutch to the right just far enough to remove it from the splines on the shaft; rotate the clutch one spline and reinstall it on the shaft.

Reinstall the sheave.

Rotate the sheave counterclockwise until the pawl contacts the stop and is no longer driven by the sheave.

Check the overlap between the stop and pawl. If it is not between 1/8″ and 1/4″ (3 mm and 6 mm), repeat the adjustment procedure.

When the clutch stop adjustment is correct, remove the sheave and install the outer brake pad and spring, 13, Figure 12-40, using an M6 x 80 cap screw and locknut. Tighten the nut two turns after it contacts the spring. If the studs, 10, do not extend through the outer pad by 1/16″ - 3/16″ (1.5 mm - 5 mm), use the jam nuts on the studs to reposition them.

Install the sheave, 1, Figure 12-37, on the shaft.

Install the sheave retaining washers and 3/16″ x 1-3/4″ cotter pin, 2. Use washers to obtain 1/64″ - 1/16″ (0.4 mm - 1.5 mm) end play of the sheave.

Install the drive belt.

CAM, CAM FOLLOWER AND WORM GEARS

NOTE: Some of the photographs used in this section were taken with the twine box and shields removed. However, it is not necessary to remove them to replace the worm gears and related parts.

Disassembly

The gear housing assembly can be taken apart without removing the housing from the baler as described below or it can be removed as an assembly by disconnecting the drag link and removing the sheave and clutch. If it was removed as an assembly, follow the same procedures to disassemble it.

Remove the drive sheave, 1, Figure 12-37, by removing the cotter pin, 2, and washers from the shaft.

Remove the clutch, 3, Figure 12-38, and brake assembly, 4, from the shaft.

Remove the cotter pin and washers, 6, from the worm gear, 7.

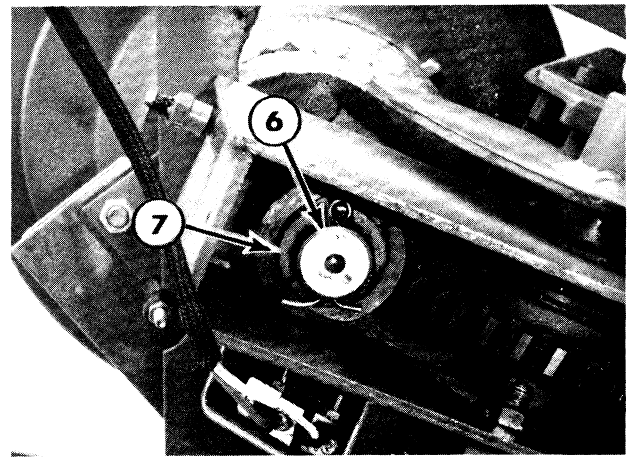


Figure 12-41

A4621-12

Rotate the shaft, 8, until the gear can be removed. Remove woodruff key and washer. Pull the shaft, 8, from the housing.

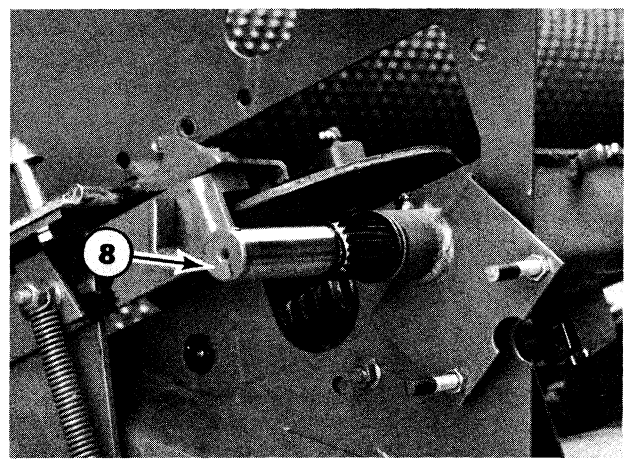


Figure 12-42

A4621-10

The parts removed from the shaft are shown in Figure 12-43.

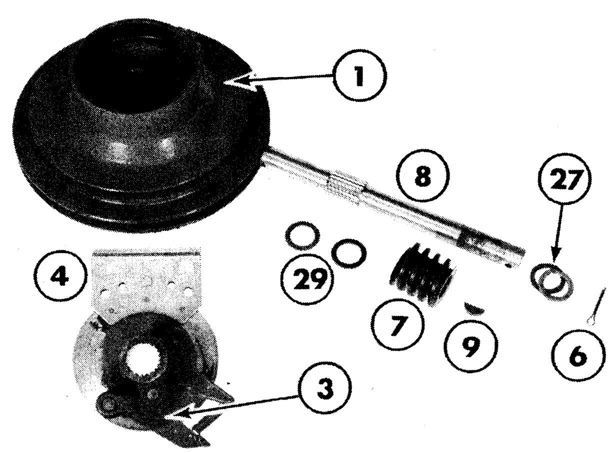


Figure 12-43

A4621-9

Remove the cotter pin, 10. Loosen and remove the alarm cam, 11.

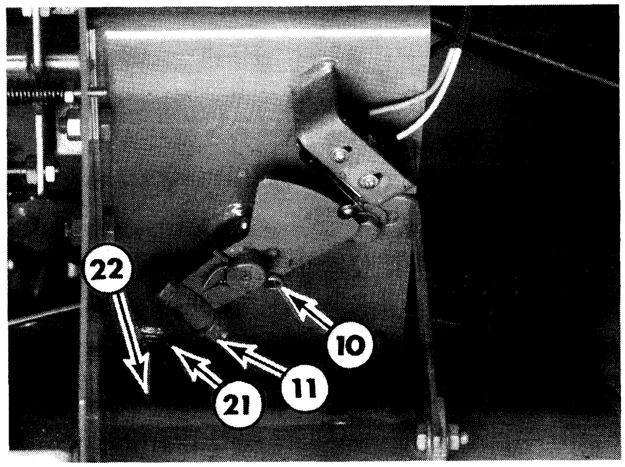


Figure 12-44

A4399-13

Use a soft punch to drive the shaft up and out of the gear, 12, and remove the shaft from the housing. Note the location of the washers, 13 and 14, on the shaft.

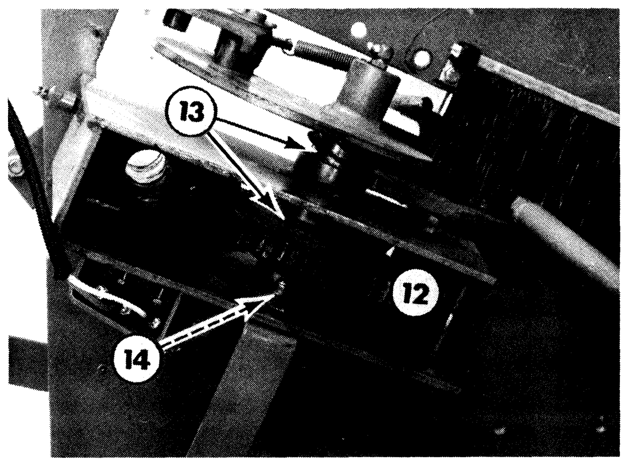


Figure 12-45

A4621-14

The shaft, gear and washers removed from the housing are shown in Figure 12-46.

Remove the spring, 16, between the cam shaft and trip, 17.

Remove the cotter pin, 18, and remove the trip, 17, from the cam plate.

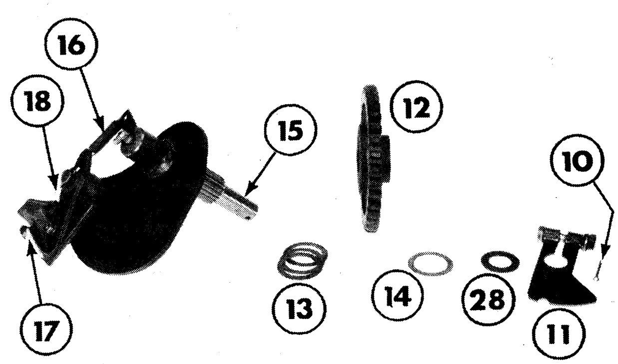


Figure 12-46

A4622-4

Loosen and remove the cam bearing, 19, from the trip, 17.

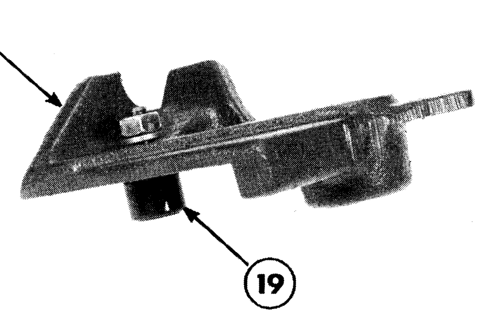


Figure 12-47

A4398-7

Disconnect the drag link from the cam follower shaft by removing the carriage bolt at 20.

Remove the cotter pin, 21, and washers, 22, from the bottom of the cam follower shaft. See Figure 12-44. Use a soft punch to drive the shaft up and out of the housing.

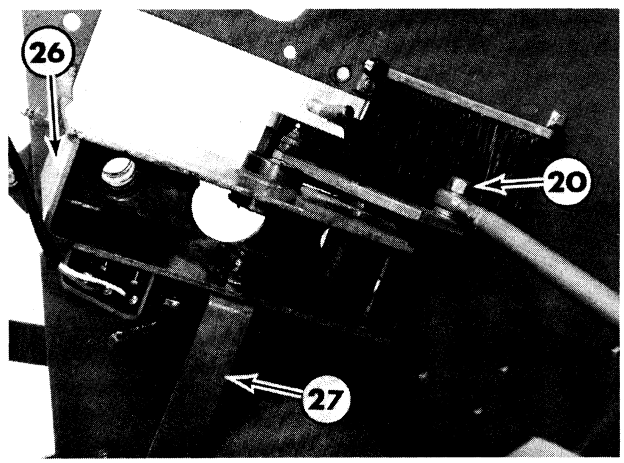


Figure 12-48

A4621-13

The shaft and washers removed from the housing are shown in Figure 12-49.

Remove the snap ring, 24, from the cam follower roller shaft and remove the roller, 25, from the shaft.

Remove the housing, 26, Figure 12-48, and brace, 27, from the baler.

Remove the brake pad studs from the housing.

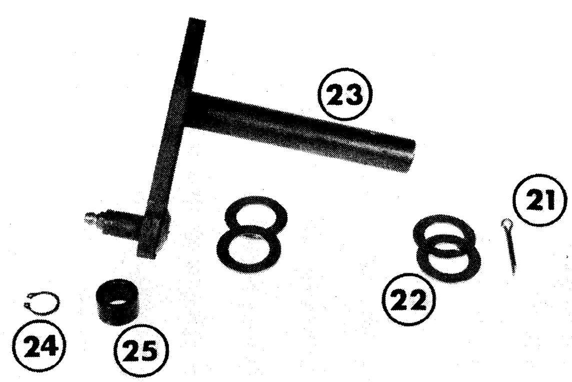


Figure 12-49

A4622-3

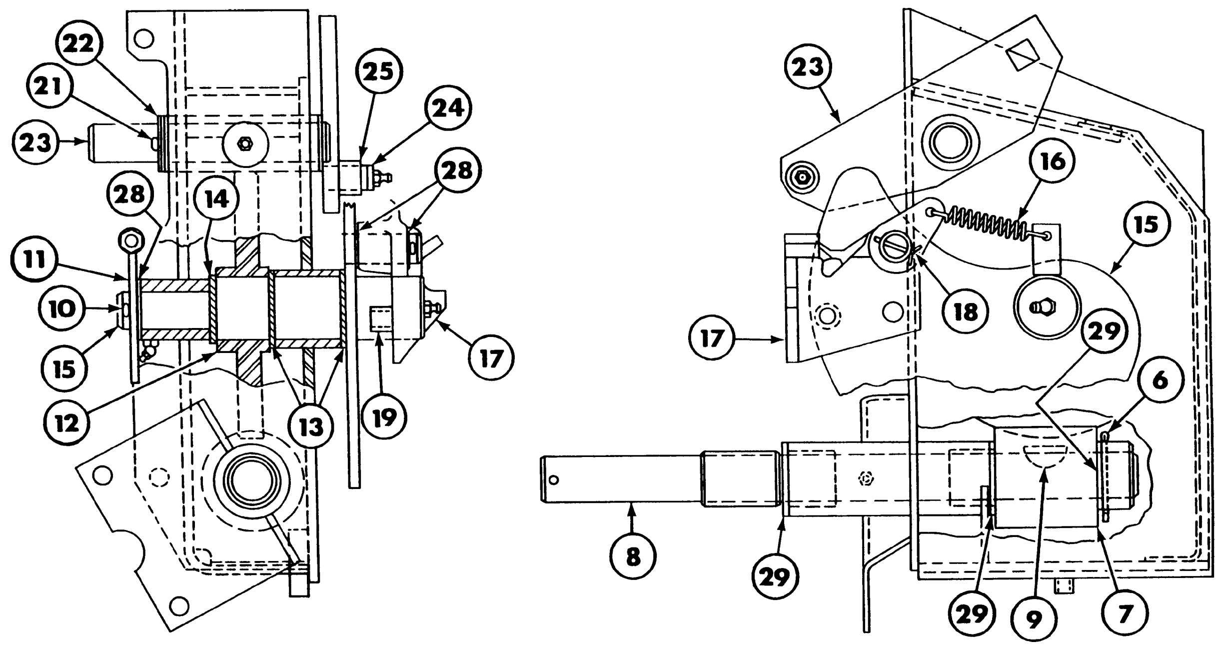


Figure 12-50

Assembly

The gear housing can be assembled except for the drive sheave and clutch and installed as an assembly if desired. Follow the same procedures as used to assemble it on the baler.

Attach the housing, 26, Figure 12-48, to the baler side sheet using three cap screws and flanged nuts.

Install the brace, 27, between the housing and tab on front of the frame tube.

Install the roller, 25, Figure 12-50, and snap ring, 24, on the cam follower shaft, 23, and then coat the shaft with grease.

Install the cam follower shaft, 23, in the housing.

Install a 1/8″ x 1-1/4″ cotter pin, 21, and washers, 22, as required at the bottom of the shaft to obtain less than 0.060″ (1.5 mm) end play in the shaft.

Install the cam bearing, 19, on the bottom of the trip, 17.

Install the trip on the cam plate with a 0.060″ (1.5 mm) thick washer, 28, on each side of the trip and install a 1/8″ x 1″ cotter pin, 18, to secure the trip.

Install the spring, 16, between the trip and cam plate tab.

Place a 0.036″ (0.9 mm), 13, washer on the cam plate shaft.

Coat the gear teeth with grease and place the gear, 12, in the housing with a nylon washer, 14, under the gear hub and 0.036″ (0.9 mm) washers, 13, as required above the hub.

Install the shaft in the housing and install a shim washer, 28; alarm, 11; and cotter pin, 10. See also Figure 12-46.

Place a 1/8″ (3.1 mm) thick washer, 29, on the input shaft, 8, and install through the housing. See also Figure 12-43. Install another 1/8″ (3.1 mm) washer inside the housing.

Install the woodruff key, 9, into the input.

Coat the worm gear, 7, with grease and place on the shaft in the housing.

Rotate gear, 12, to cause worm gear, 7, to be pulled onto the input shaft while maintaining alignment with the woodruff key.

Install the remaining 1/8″ (3.1 mm) washers (2±) and install 3/16″ x 1-1/2″ (0.19 mm x 1.5 mm) cotter pin.

Turn the shaft by hand to check for binding for a complete revolution of the gear.

Install the two brake support studs, 30, in the housing bracket using four jam nuts to position the studs as shown.

Place the inner brake pad, 4, on the studs on the housing bracket.

Install the clutch assembly, 3, Figure 12-38, on the shaft.

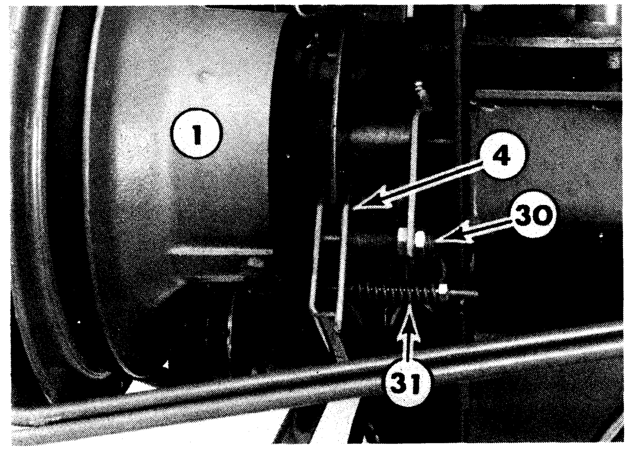


Figure 12-51

Install the drive sheave, 1, on the shaft by holding the pawl, 11, up so the roller will go inside the sheave. Do not install the sheave retaining hardware until the adjustment is checked. Turn the sheave until the cam reaches the home position and the clutch pawl contacts the stop on the knife operating slide and disengages the clutch. Check the overlap between the stop and pawl. When the clutch is in the disengaged position as shown in Figure 12-52, the clutch pawl, 11, should overlap the stop, 12, by 1/8″ to 1/4″ (3 mm to 6 mm). If required, adjust the clutch as described in the preceding section.

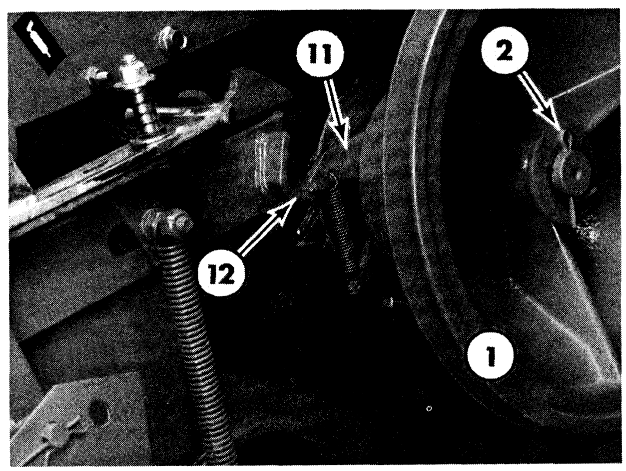


Figure 12-52

A4399-16

When the clutch stop adjustment is correct, remove the sheave, 1, Figure 12-51, and install the outer brake pad, 4, and spring, 31, using an M6 x 80 cap screw and locknut. Tighten the nut two turns after it contacts the spring. If the studs, 30, do not extend through the outer pad by 1/16″ - 3/16″ (1.5 mm - 5 mm), use the jam nuts on the studs to reposition them.

Install the sheave, 1, Figure 12-52, on the shaft.

Install the sheave retaining washer and 3/16″ x 1-3/4″ cotter pin, 2.

Attach the drag link to the cam follower using an M12 x 45 carriage bolt, 18, Figure 12-47, and locknut with three 5/32″ (4 mm) thick washers, 31, between the rod end and cam follower.

Locate alarm cam, 11, so the alarm does not sound in the home position and tighten the clamp bolt.

NOTE: Shim the alarm switch, 32, so its roller is centered on the cam.

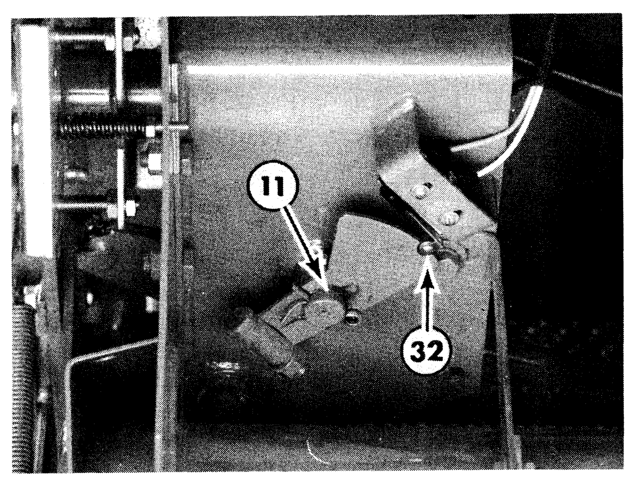


Figure 12-53

A4392-13

TRIP SLIDE

There are two types of trip slides, 1, used with the Auto-Wrap system as shown in Figures 12-54 and 12-55.

To remove the slide:

Disconnect the slide from the trip linkage by removing the cap screw and locknut at 2, Figures 12-54, or the connector and cotter pin at 3, Figure 12-55.

Remove the spring, spacer, and washers at 4.

Lift the slide off the mount and manual trip lever pin, 5.

To install the slide:

Apply a thin coat of dry lubricant to the bottom of the slide, 1, Figures 12-54 and 12-55, and place the slide on top of the mount and over the manual trip lever pin, 5. Place a 3/8″ x 2-1/2″ cap screw through the mount and slide at 4. Install a spacer, washer, spring, washer and locknut above the slide in the order listed. The spacer should fit in the slot in the slide. Tighten the locknut to secure the cap screw.

Connect the slide to the trip linkage by installing either a cap screw and locknut at 2, Figure 12-54, or the connector and a cotter pin at 3, Figure 12-55. Do not over tighten the locknut as the tabs on the slide may be forced against the linkage and not allow the slide to move freely.

Lift and release the front of the slide to be sure it does not bind on the spacer. If the slide does not move freely, it may not drop in the manual trip notch in the trip as a wrap cycle is completed.

Trip the clutch manually and turn the drive sheave to move the twine tubes through a wrap cycle. During the cycle, check to be sure that the side of the trip slide does not contact the edge of the trip.

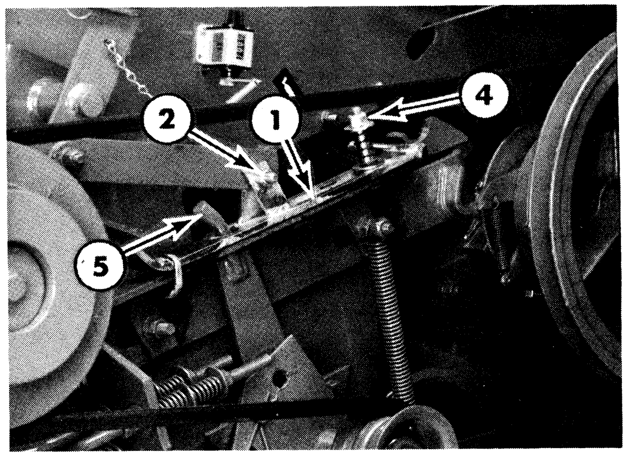


Figure 12-54

4399-9

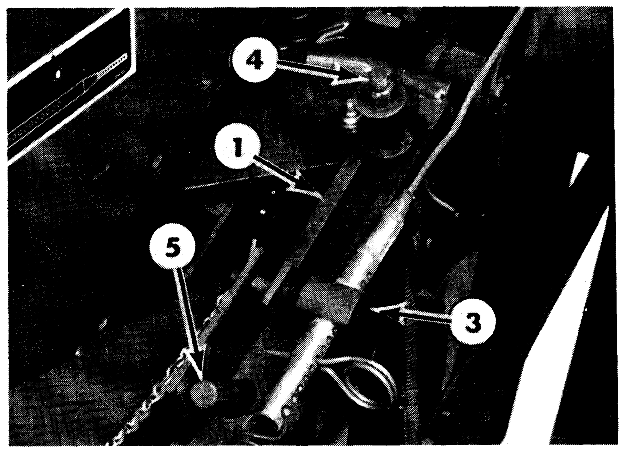


Figure 12-55

KNIFE OPERATING SLIDE

The knife operating slide, 1, is moved to the knife open position by spring, 2, when the Auto-Wrap is tripped. The tab on the slide pushes on the nuts, 3, on the knife actuating rods to open the knives. As the cam returns to the home position, the roller on the bottom of trip, 4, contacts the tab on the slide and pulls it to the home (cut) position. The tab on the other end of the slide compresses the springs, 5, on the knife actuating rods and moves the knives to the cut position.

The knife operating slide must move freely. The slide is held in position on the baler by rectangular guide plates, 6. It slides on the spacers under the washers or plates.

To remove the slide:

Trip the Auto-Wrap manually and turn the sheave until the twine tubes drop.

Remove spring, 2.

Remove the springs, 5, from the knife actuating rods.

Remove the manual trip lever spring, 7, by removing the nut from the front mounting bolt.

Remove the nuts from the cap screws, 8, and the lock washer; plate, 6; and spacer under them.

Lower the slide and pull it off the knife actuating rods.

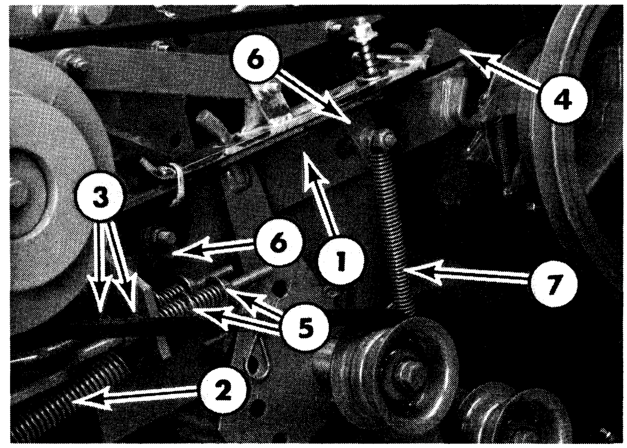


Figure 12-56

4399-9

To install the slide:

Place the slide, 1, Figure 12-56, over the knife actuating rods and lift it into position.

Place the spacers on cap screws, 8. Place the slide over the spacer and install the plate, 6, lock washer and nut on the outside of the slide.

Install the springs, 5, on the knife actuating rods in the following sequence: washer, spring, washer, spring, washer, nut.

Return the twine tubes to the home position.

Adjust the nuts on the knife actuating rods to compress the springs, 5, to a total length of 2-1/2″ (64 mm). Adjust the nuts, 3, so there is a gap of 1/8″ (3.5 mm) between the washer and the tab.

NOTE: If the washers between nuts, 3, and the slide are against the slide with the twine tubes in the home position, the twine may not be cut as the springs, 5, cannot pull the knives tight against the striker plates.

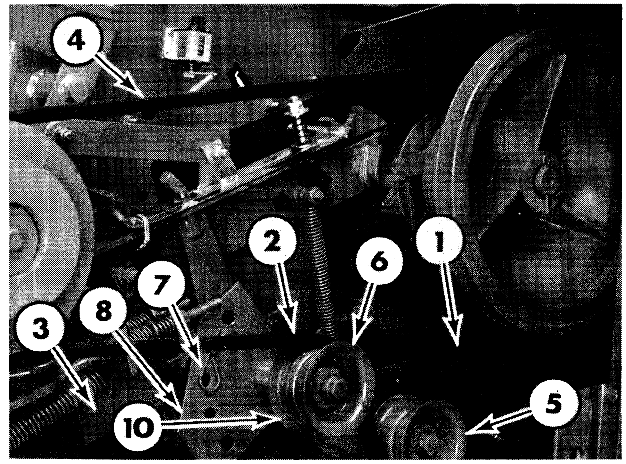
Install the manual trip lever spring, 7, using a locknut on the front slide mounting bolt.

MOUNTING PLATE, IDLER ASSEMBLY AND MANUAL TRIP LEVER

The idler assembly and manual trip lever, 1, pivot on a shaft welded to a bracket, 2, mounted to the trip mounting plate, 3. The cap screws attaching the bracket are also used to attach the mounting plate to the side sheet.

The mounting plate and idlers can be removed as an assembly by disconnecting the trip linkage, knife operating rods and removing the knife slide and belt tension springs, and the full bale switch and cable. The mounting plate can then be removed by removing the three cap screws attaching it to the side plate. The idlers can be disassembled as described below.

The assembly can be disassembled and assembled without completely removing the mounting plate from the baler.

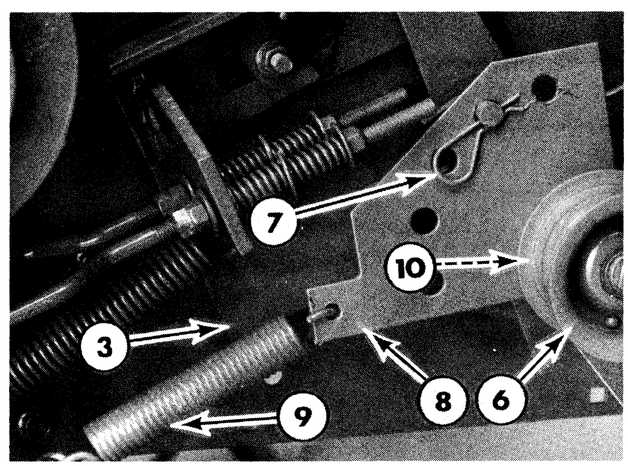


A4399-9

Figure 12-57

Disassembly

1. Remove the drive belt, 4.
2. Remove the cap screw, spacer, washers and the idler, 5, on the pivoting bracket.
3. Remove the cap screw, lock washer, washers and the stationary idler, 6.
4. Remove the hairpin cotter, 7, from the pin on the pivoting idler bracket and slide the spring bracket, 8, off the pin to reduce tension on the spring.
5. Remove the belt tension spring, 9.
6. Remove the grease fitting from the hub of the pivoting bracket, 10, and slide the spring bracket, 8, off the hub.
7. Slide the pivoting bracket, 10, off the bracket and shaft.
8. Remove the bracket and shaft, 2, Figure 12-57, with the manual trip lever, 1, installed by removing the two cap screws and washers plus the spacers between the bracket and mounting plate. Lower the assembly to remove the trip lever pin from the trip slide. There may be washers between the mounting plate and frame that may drop when the pivot shaft and bracket is removed.
9. Slide the manual trip lever, 1, off the shaft.



A4399-15

Figure 12-58

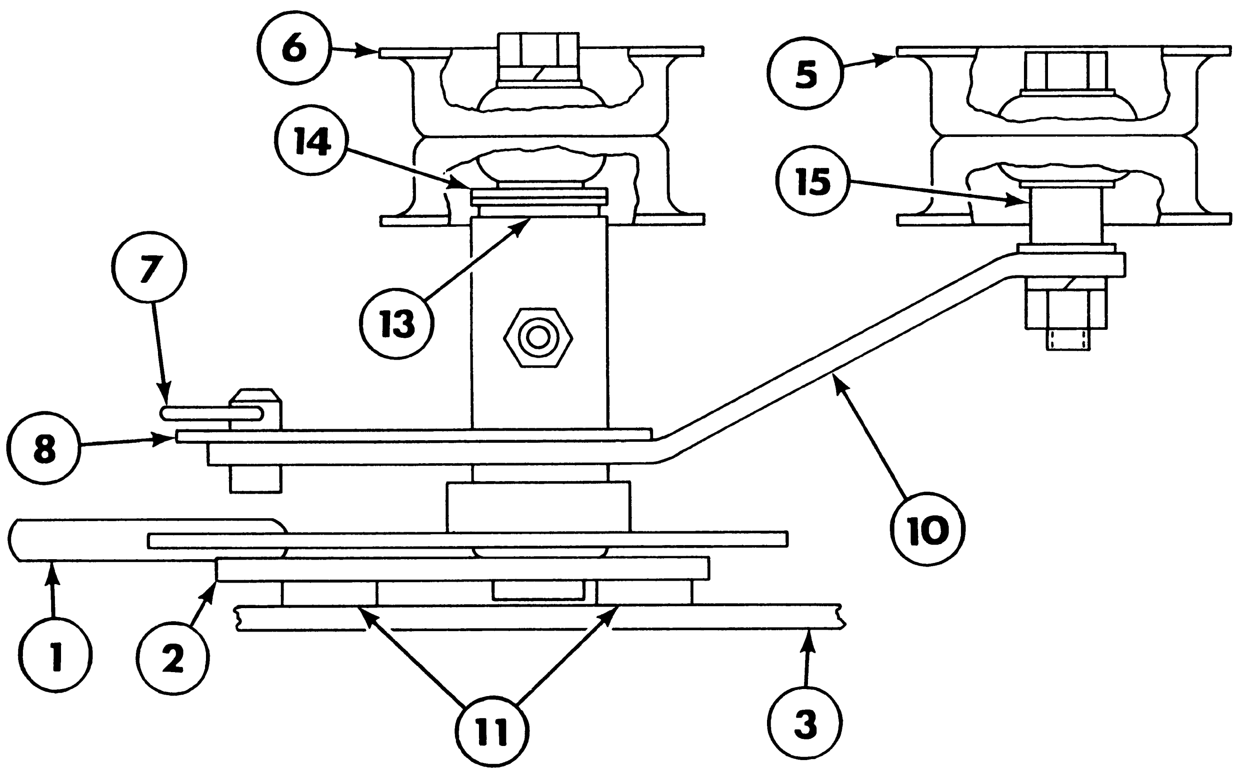


Figure 12-59

10. Remove the rear cap screw holding the mounting plate, 3, to the baler. There may be washers between the mounting plate and frame that may drop when the mounting plate is removed.

Assembly

1. If the mounting plate, 3, Figure 12-58, was removed, use an M10 x 50 cap screw, washer and lock washer to attach the rear of the plate to the side sheet. If there were washers between the mounting plate and frame they should be reinstalled also. Do not tighten the cap screw until the clearances in step 3 are adjusted.
2. Coat the bracket shaft, 2, Figure 12-59, with grease and slide the manual trip lever, 1, and pivoting bracket, 10, on the shaft.

3. Attach the bracket to the mounting plate and side sheet using two M10 x 50 cap screws, washers and lock washers plus 1/4″ (6.3 mm) thick spacers, 11, between the bracket and plate. If there were washers between the mounting plate and frame they should be reinstalled also. Check the overlap between the roller, 12, on the bottom of the trip and the tab on the knife slide. The end of the tab should extend past the center of the roller by 1/16″ (1.5 mm). The end of the tab should be 3/16″ to 1/4″ from the left edge of the roller. If the tab is too far to the right, either add washers between the mount plate and side sheet or grind the tab. There should be 1/16″ to 1/8″ (1.5 mm to 3 mm) clearance between the trip, 2, and the top of the knife operating slide. Loosen the three cap screws through the mounting plate and tilt the plate to obtain the clearance.

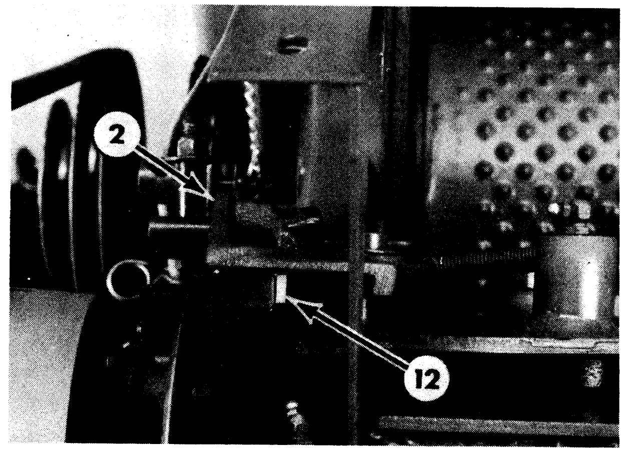


Figure 12-60

4. Place the spring bracket, 8, Figure 12-59, on the hub of the pivoting bracket, 10, and install a 1/4″-28 grease fitting in the hub.
5. Attach the spring, 9, Figure 12-58, to the bracket.
6. Use 0.060″ (1.5 mm) thick washers, 13, Figure 12-59, on the bracket shaft to obtain less than 0.060″ (1.5 mm) end play of the pivoting bracket after the idler, 6, is installed.
7. Use washers, 14, between the end of the shaft and the idler, 6, to align the edge of the idler with the edge of the driven sheave. Attach the idler to the end of the shaft using a 1/2″ x 2-1/4″ cap screw and lock washer.
8. Use a 1/2″ (13 mm) long spacer, 15, and washers to align the pivoting idler, 5, with the stationary idler and attach the idler to the bracket using a 1/2″ x 2-3/4″ cap screw, lock washer and nut.
9. Install the drive belt, 4, Figure 12-57.
10. Place the spring bracket over the pin on the pivoting idler bracket and install a hairpin cotter, 7. Use the hole in the spring bracket that will apply tension to the belt. Adjust the eyebolt to obtain 2″ (50 mm) deflection at mid-span of the belt when 10 lbs. (4.5 kg) force is applied.

TRIP LINKAGE

The trip linkage must operate freely to consistently trip at the same bale size.

The Model 644 trip linkage is shown in Figures 12-61 and 12-62. A roller, 1, at the top of a long pivoting arm, 2, follows a cam, 3, on the take-up arm. As the bale increases in size, the long arm moves a short pivoting arm, 4, that is connected to the trip slide, 5, by an adjustable link, 6, and a fixed link, 7. The adjustable link is used to change the bale size. With a distance of 7″ (178 mm) between the attaching pin and bolt for the adjustable link, the bale size will be approximately 48″ (122 cm). A spring, 8, is attached to the fixed link to return the arm to the reset position.

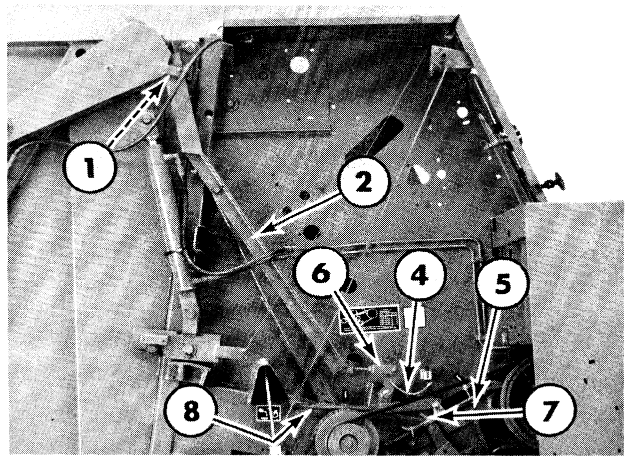


Figure 12-61

A4399-5

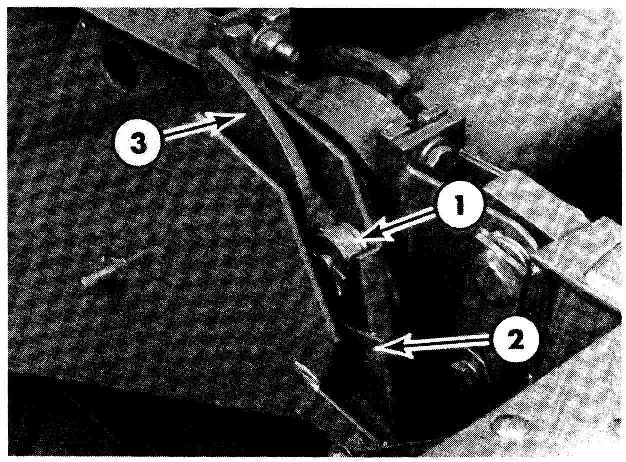


Figure 12-62

A4399-12

The linkage for the Models 654 and 664 is shown in Figures 12-63 and 12-64. A chain, 1, attached to a plate, 2, is routed over the take-up arm, 3, and connected to cable, 4, that has an adjustable end that slides through a connector, 5, attached to the trip slide, 6. A spring, 7, applies tension to the cable before the take-up arm starts to move. A hairpin cotter, 8, through the adjustable end of the cable is used to adjust bale size. With the hairpin cotter in the 5th hole from the rear as shown, the bale size will be approximately 60″ (152 cm). Each hole position changes bale size approximately 3″ (76 mm).

With the chain, 1, connected to the center hole in plate, 2, and the hairpin cotter, 8, in the fourth hole from the front of the cable end, the spring should have a slight amount of tension applied to the cable and the rod on the trip slide, 6, should be against the rear of the trip, 9. If there is no tension on the cable in this position, adjust idler, 10, to remove all slack from the cable. This will produce approximately a 48″ (120 cm) diameter bale. If unable to obtain this adjustment, move the chain to one of the other holes in plate, 2, and repeat the adjustment procedure.

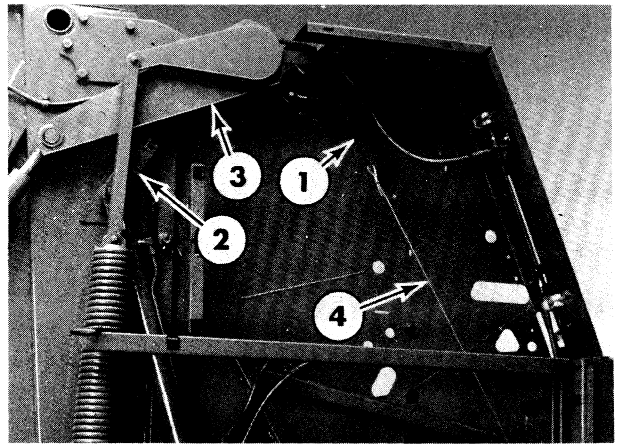


Figure 12-63

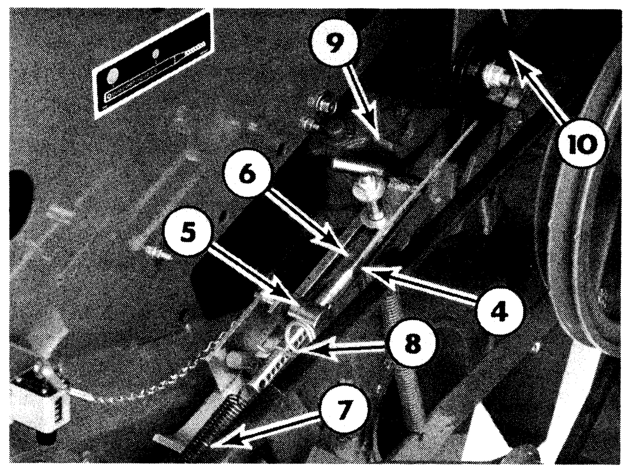


Figure 12-64

A3995-12

FULL BALE ALARM

The full bale alarm alerts the operator when the Auto-Wrap trips and when the bale is finished wrapping. A single microswitch is activated when a full bale is reached. Once tripped, the alarm will sound until the twine tubes have dropped to the center of the bale chamber. This is approximately 3 seconds.

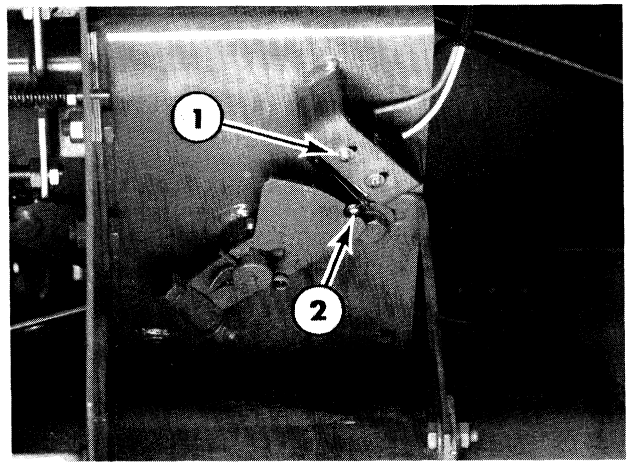


Figure 12-65

A4399-13

After the tubes have dropped to the start position, the alarm will stop sounding. It will resume the alarm after the twine tubes have returned to home position. It will stop when the cycle has completed and the microswitch roll, 2, has returned to the detent position shown in Figure 12-65.

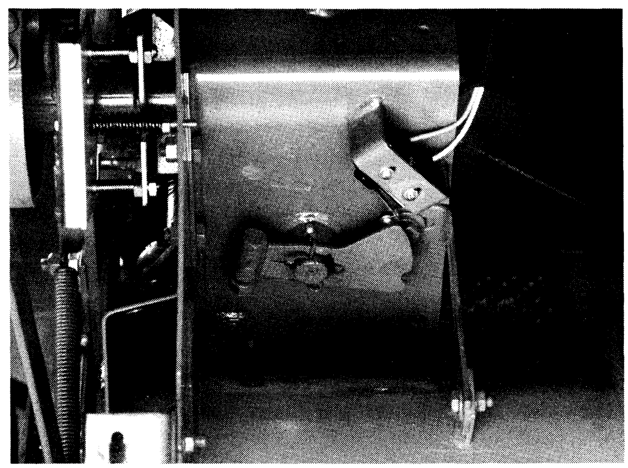


Figure 12-66

A4600-4

The alarm assembly, 1, mounts on the tractor at any convenient location. It has a gate-type rotary slide, 2, to increase or decrease the sound level. It has an inline 15-amp fuse, 3, for component protection on the power supply wire.

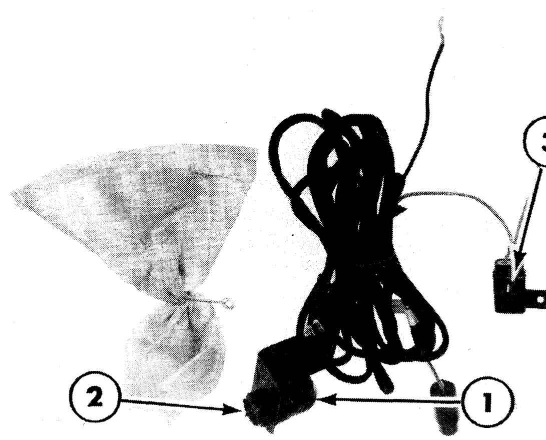


Figure 12-67

A3997-16

The microswitch, 1, is properly adjusted when the Auto-Wrap twine system is in the home position, with the switch roll, 2, in the cam detent notch. The alarm should not sound in this position. The roll, 2, should align with the cam, 3. If necessary, remove the microswitch and add or remove shim washers between switch and mount on retaining screws, 4.

Manually trip the twine system and cycle the wrapper. The alarm should sound soon after tripping, and stop when the tubes have dropped to the center or start position. Failure to hear the alarm would require fine tuning of the microswitch at 4. Complete the tie cycle to insure the alarm will stop sounding when returned to the home position.

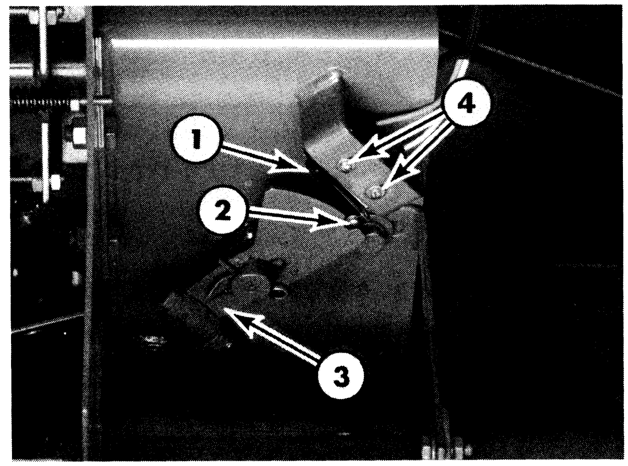


Figure 12-68

A4399-13

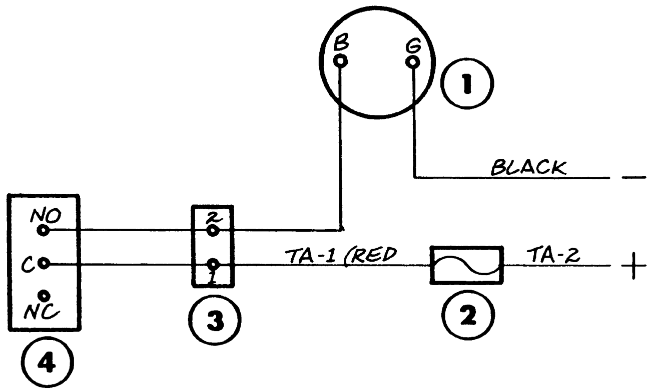


Figure 12-69

Figure 12-69 is an electrical diagram of the full bale alarm circuit that can be used to troubleshoot the system using a 12V test light. The following items are shown on the diagram:

1 Alarm

2 Fuse

3 Connector plug

4 Microswitch

To test the circuit:

Stop the baler and tractor.

Trip the Auto-Wrap manually.

Manually rotate the wrapper until the switch is out of detent position right against the cam face. The alarm should be **on**. If not, check with the test light starting at the plug, switch, and finally the alarm. After the problem has been corrected, cycle the wrapper to return the twine tubes to home position.

LABOR GUIDE

	HOURS
Cam follower shaft, R & R	1.00
Cam follower roller, R & R	0.50
Cam gear, R & R	1.50
Cam and shaft, R & R	1.50
Clutch,	
R & R	0.50
Adjust stop	0.50
Clutch brake,	
R & R	0.60
Adjust	0.20
Drag link,	
R & R	0.50
Adjust	0.25
Drive shaft, worm gear, R & R	1.50
Drive belt, R & R	0.10
Driven sheave, R & R	0.25
Gear housing, R & R	2.00
Idler, belt, R & R	0.50
Idler arm, belt, R & R	0.75
Idler support, R & R	1.00
Knife, R & R	0.50
Knife operating rod,	
Adjust	0.10
R & R	0.25
Knife rod spring,	
Adjust	0.10
R & R	0.20
Knife support, left, R & R	1.50
Knife support, right, R & R	1.00
Knife slide, R & R	1.50
Knife slide support, R & R	2.00
Manual trip lever, R & R	1.00
Trip casting, R & R	0.50
Trip roller, R & R	0.50
Trip slide, R & R	0.75
Twine tube,	
R & R	0.75
Adjust	0.50
Twine tube breakaway eccentric,	
R & R	0.50
Adjust	0.25
Twine tube bullet, R & R	0.25
Twine tube holder and shaft, R & R	1.50
Twine tube gear, R & R	0.50
Twine tube breakaway,	
R & R	1.00
Adjust	0.25
Twine tube support, R & R	2.00
Worm gear, R & R	1.50
Worm gear shaft, R & R	1.50

INDEX

SECTION 13

BALE COMMAND MECHANICAL SYSTEM MODELS 644, 654, AND 664

This portion of the manual covers the mechanical parts of the Bale Command Plus twine and net wrappers. Refer to Section 14 for the electronic portion of the Bale Command Plus system.

TWINE WRAPPING CYCLE OPERATION

The twine wrapper used on the Bale Command Plus machines is the same as the twine system on the Auto-Wrap™ machines, except that the twine tubes are operated by an electric actuator, 1, instead of the cam follower and gears on the Auto-Wrap machines.

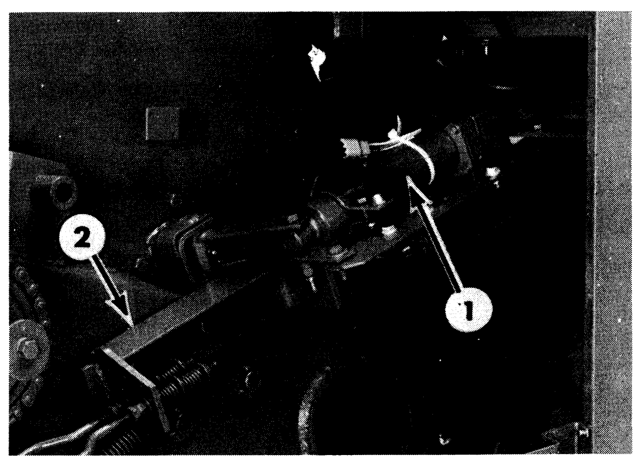


Figure 13-1

1629-6

When the actuator is extended, the knife operating slide, 2, opens the twine knives, 3, and the twine tubes, 4, move to the twine start position as shown. As the actuator is retracted, the twine tubes pivot toward the outside of the baler. The Bale Command Plus controller stops and starts the retracting movement of the actuator to position the twine on the bale.

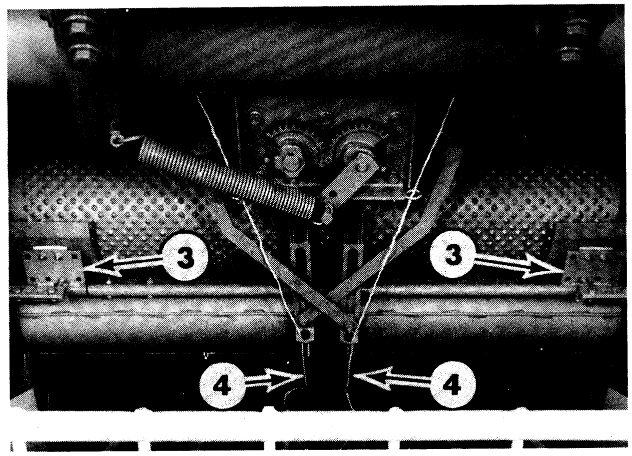


Figure 13-2

2366-3

As the twine arms reach the home position, the knives close to cut and hold the twine as shown.

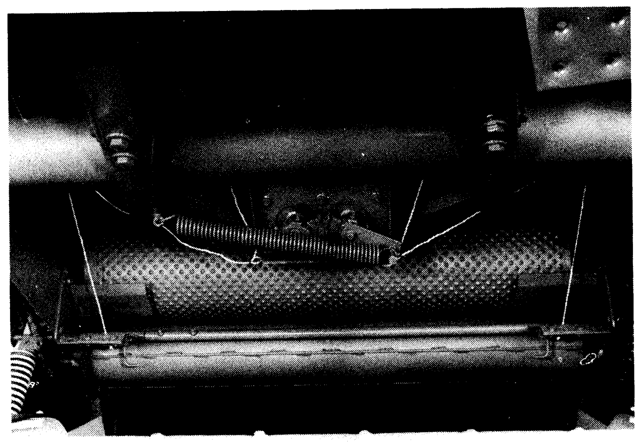


Figure 13-3

2366-2

TWINE WRAPPER ADJUSTMENTS

KNIFE

The twine knives must be kept sharp and must make contact with the striker plate for the full length of the knife.

TWINE KNIFE TENSION

The twine knives operate independently of each other. The left knife is operated by spring-loaded rod, 1. The right knife is operated by spring-loaded rod, 2. If the knife supports are "frozen" together, one side may not cut the twine as the knife will not be pulled against the striker plate.

To adjust the knife tension:

Retract the actuator to the home position.

Adjust the nuts on the knife actuating rods, 1 and 2, to compress the springs, 3, to a total length of 2-1/2″ (64 mm). Adjust the nuts, 4, so there is a gap of 1/8″ (3.5 mm) between the washer and the tab.

NOTE: If the washers between nuts, 4, and the slide are against the slide with the actuator retracted, the twine may not be cut as the springs, 3, cannot pull the knives tight against the striker plates.

When using some types of twine it may be necessary to increase the tension on the knives by compressing the springs, 3, to less than 2-1/2″ (64 mm). Before compressing the springs to less than 2-1/8″ (54 mm), check to be sure that the knives are sharp and make full contact with the striker plates.

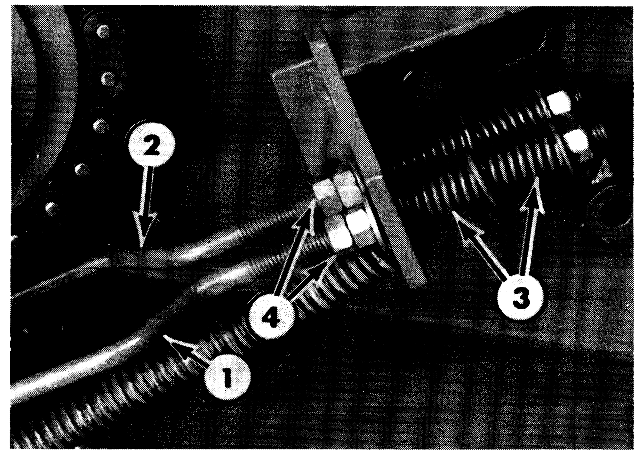


Figure 13-4

1087-2

TWINE TUBES

The twine tubes should be adjusted so there is a gap of approximately 2″ - 3″ (51 mm - 76 mm) between the ends of the twine tubes when they are in the “twine start” position as shown.

To adjust the twine tubes:

Extend the actuator as far as possible to place the tubes in the “twine start” position.

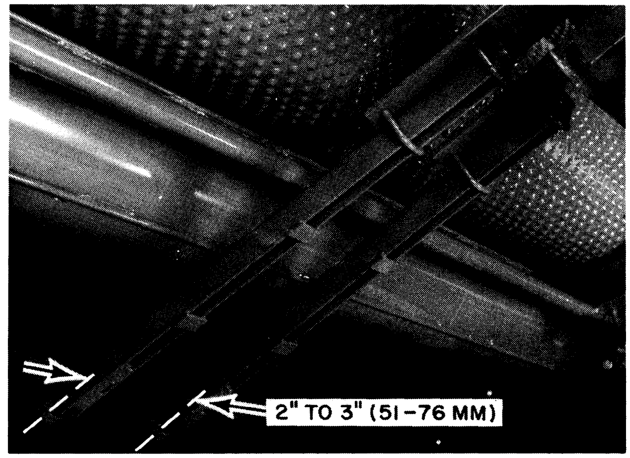


Figure 13-5

4622-6

Loosen jam nuts, 1.

Rotate the drag link tube, 2, to obtain a gap of 2″ (52 mm) between the ends of the twine tubes.

Return the twine tubes to the home position and check for interference between the ends of the tubes and the frame. Readjust the tube to obtain clearance if required.

Tighten the jam nuts, 1.

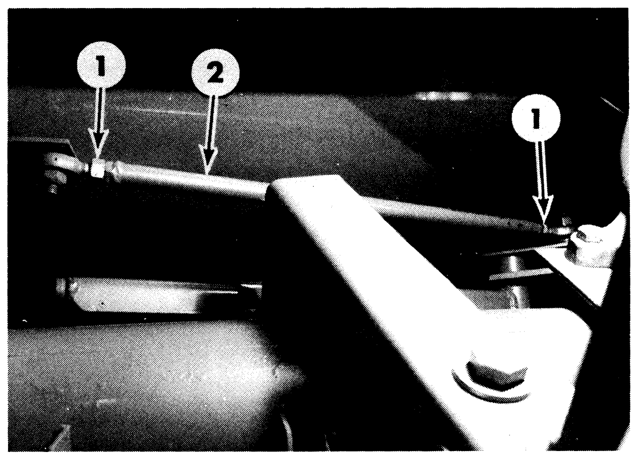


Figure 13-6

1084-1

After the drag link is adjusted, check the clearance between the eccentric collar, 3, and the breakaway arm, 4. If the clearance is not between 1/64″ and 1/32″ (0.4 mm and 1.6 mm), loosen the setscrew in the collar and rotate the collar to adjust the clearance and then tighten the setscrew. If the clearance is too great, it may be difficult to reset the breakaway.

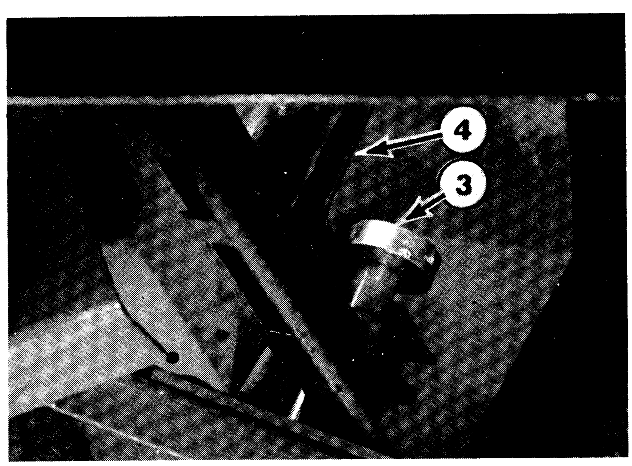


Figure 13-7

1084-6

TWINE TUBE BREAKAWAY

The breakaway system should be adjusted so that a pull of 105 pounds (467 N) at the end of the twine tube is required to disengage the breakaway as shown. To reset the breakaway, grasp one of the twine tubes and pull toward the home position. The two halves of the breakaway should snap together as shown in Figure 13-9. The breakaway is held in the normal operating position by a spring-loaded ball inside the arm, 1, Figure 13-8, attached to the twine tube pivot shaft. The ball seats in arm, 2, attached to the drag link.

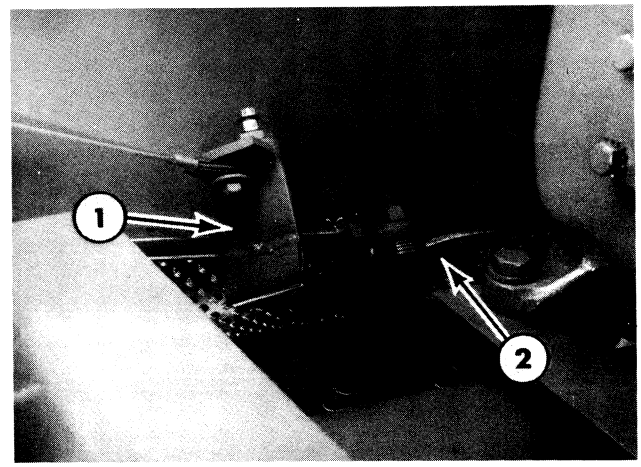


Figure 13-8

3983-8

To adjust the breakaway force:

Loosen the jam nut, 3.

Turn screw, 4, clockwise to increase the breakaway force or counterclockwise to reduce the force. One rotation of the screw will change the breakaway force by 12 lbs. -13 lbs. (53 N - 58 N).

When the setting is correct, tighten the jam nut, 3.

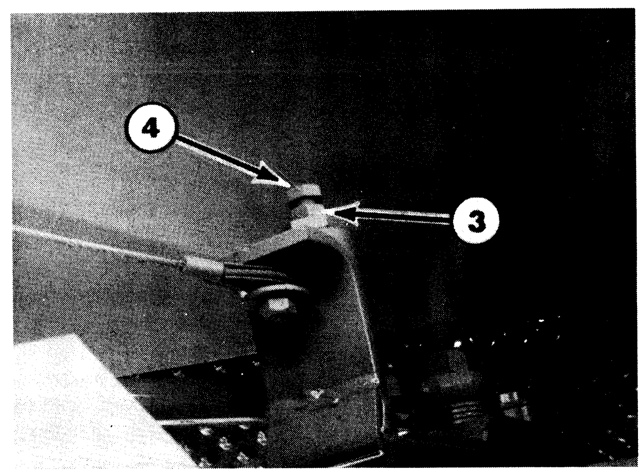


Figure 13-9

3983-1

TWINE WRAPPER REPAIR

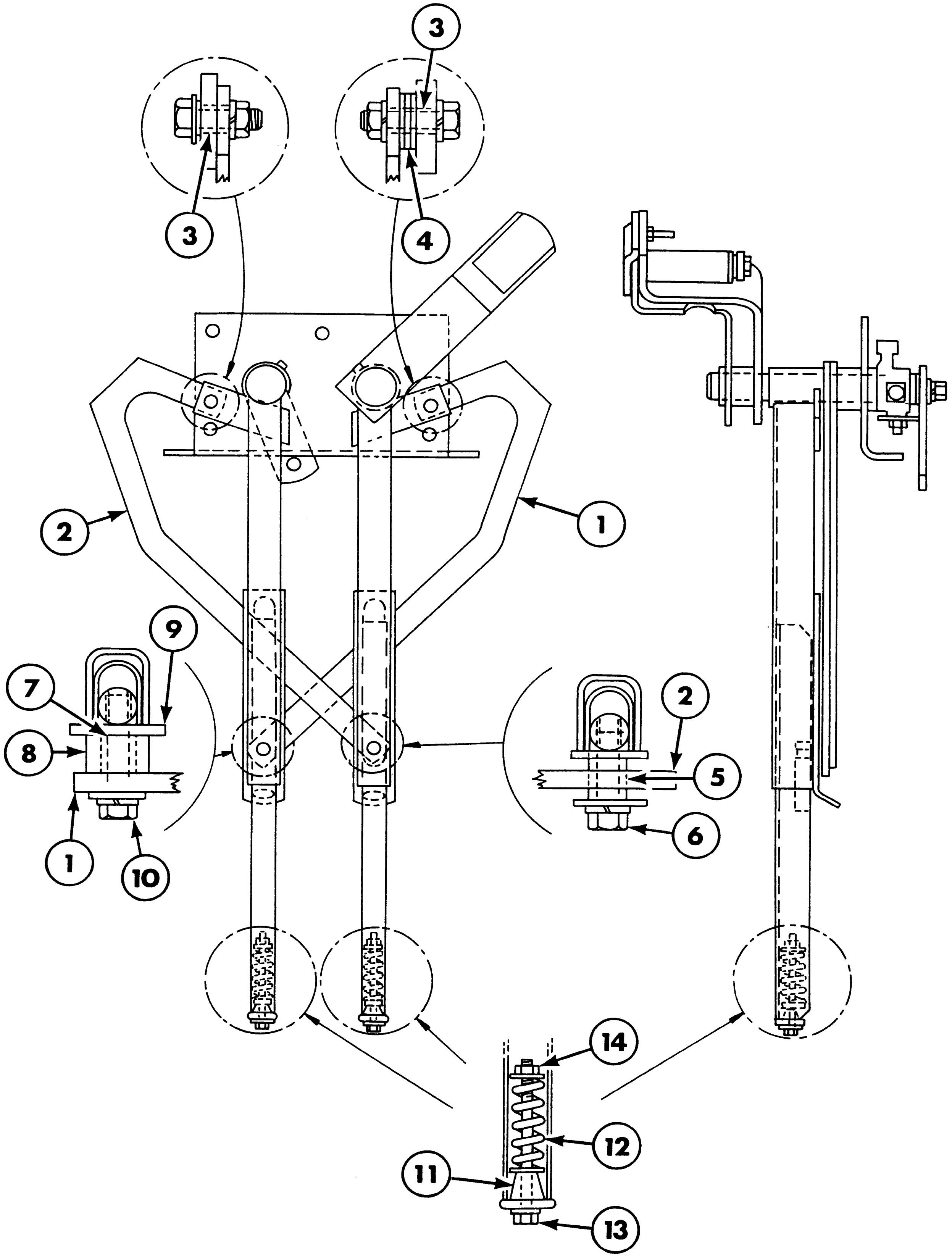


Figure 13-10

EXTENDABLE TWINE TUBES, MODELS 644 AND 654

The extendable twine tubes slide in the twine tubes when the tube assembly is moved through its cycle. The tubes must be installed as shown in Figure 13-10 to be sure that they can move freely. The right-hand link, 1, must be below the left-hand link, 2. The links are attached to the tube and shaft weld assemblies as shown using 5/16″ (8 mm) long spacers, 3, and washers, 4, to position them. The left link is attached to the right telescoping tube using a 17/32″ (13.5 mm) long spacer, 5, and a M8 x 30 cap screw, flat washer, and lock washer at 6. The right link is attached to the left telescoping tube using a 1-1/32″ (26.2 mm) long spacer, 7; a 3/8″ (9.5 mm) long spacer, 8; a washer, 9; and a M8 x 40 cap screw, lock washer and washer at 10.

TWINE TUBE "BULLETS"

There are spring-loaded "bullets," 11, Figure 13-10, in the end of the Models 644, 654, and 664. They hold the twine in the tube when the tubes return to the home position after the twine is cut and prevent the twine from coming out of the tubes until they drop to the start position.

The bullet, 11, seats against a ring in the end of the tube. Spring, 12, is installed inside the tube. The bullet and spring are held together by a 1/4″ x 4″ cap screw, 13, and a locknut, 14. Tighten the locknut until 2 or 3 threads are completely through the nut. See Figure 13-10.

TWINE TUBE BRACKET AND PIVOT ASSEMBLY

The Models 644 and 654 extendable twine tubes, 1, Figure 13-11, and the Model 664 twine tubes, 1, Figure 13-14, are attached to brackets, 2, Figure 13-12 (Model 664 shown), welded to pivoting shafts.

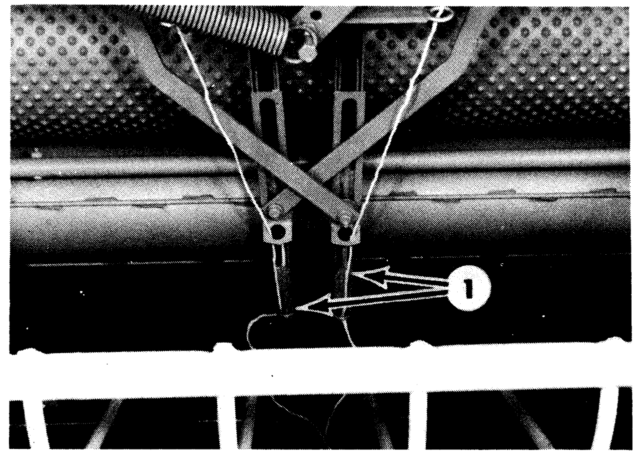


Figure 13-11

2366-3

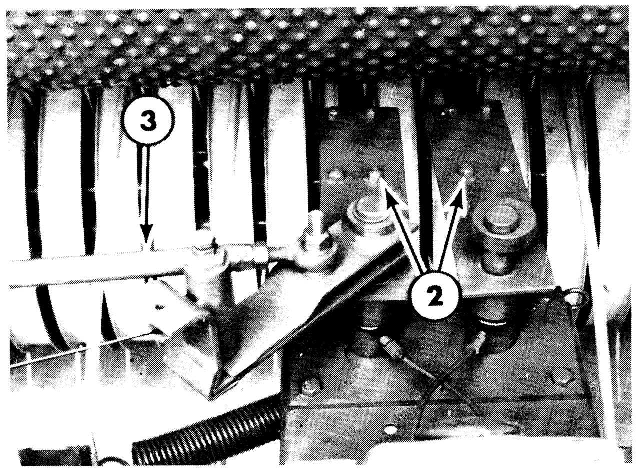


Figure 13-12

A4621-6

The right-hand tube is controlled by the drag link, 3, connected to a pivoting link, 4, attached to the electric actuator, 5.

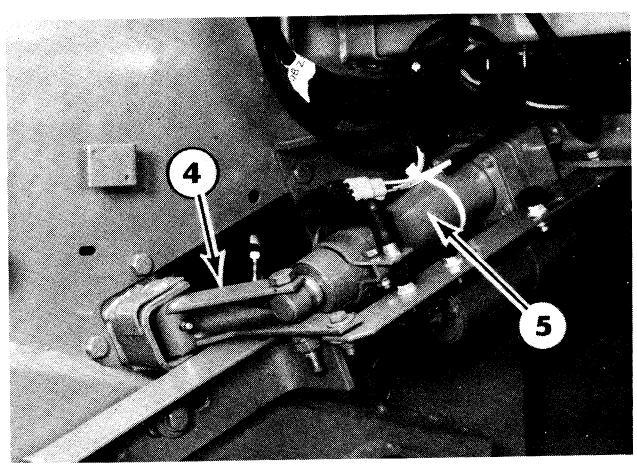


Figure 13-13

1634-1

The left tube is controlled by gears, 6, attached to the bottom of the twine tube pivot shafts.

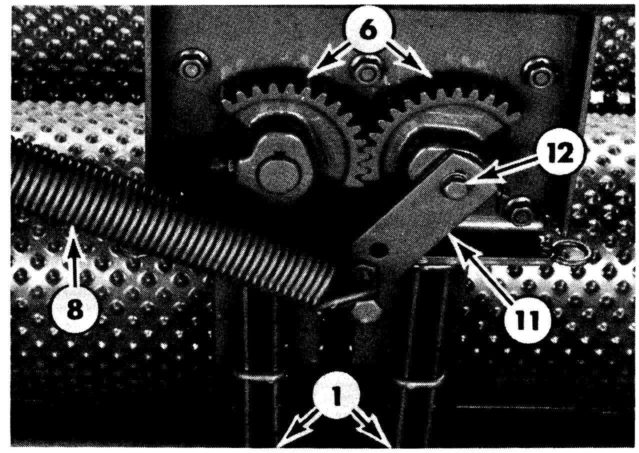


Figure 13-14

2372-11

Disassembly- Model 664 shown, the Models 644 and 654 are similar

Grab the end of one of the twine tubes and give it a quick pull to separate the breakaway as shown. This will make it easier to remove the breakaway from the shaft bracket.

Remove the indicator cable, 7, from the bolt on the breakaway bracket.

Remove the twine tubes, 1, Figure 13-14, from the brackets.

Remove the spring, 8, from the left gear.

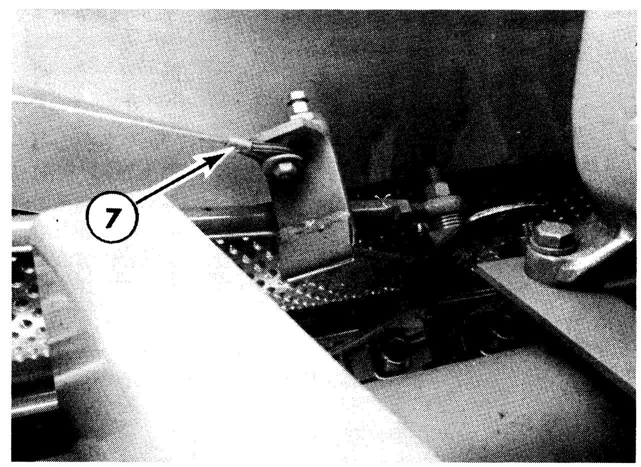


Figure 13-15

3983-8

Disconnect the drag link by removing the nut from the carriage bolt at 9.

The pivot assembly can be disassembled when it is mounted on the baler as described below or the complete assembly can be removed as a unit by disconnecting the drag link, indicator cable, and spring as described above and then removing grease lines and the five cap screws securing the mounting plate, 10, to the baler. If the complete assembly is removed, follow the same procedures to disassemble it.

Remove the gears, 6, Figure 13-14, and spring bracket, 11, from the bottom of the shafts by removing the four setscrews and the center bolt, 12. Remove the woodruff keys from the shafts.

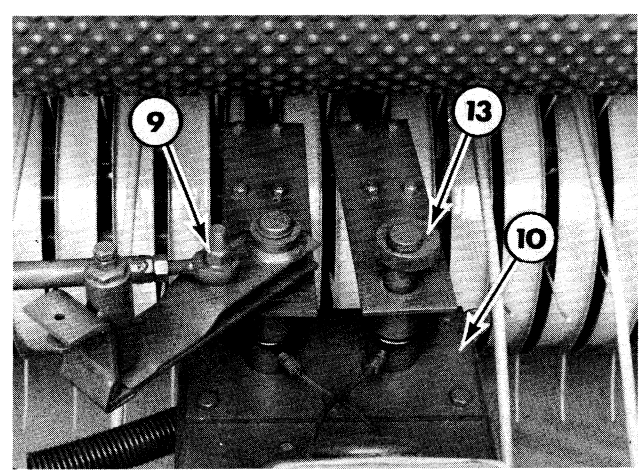


Figure 13-16

A4621-6

Remove the eccentric, 13, Figure 13-16, by loosening the setscrew.

Lift the shaft and bracket assemblies out of the mounting bracket.

The parts removed from the mount are shown in Figure 13-17. The breakaway is shown engaged.

Figure 13-17

A4622-1

Remove the breakaway, 1, from the shaft and bracket weld assembly, 2, by removing the snap ring, 3, and any washers that may be on the shaft. If the breakaway was not separated as shown in Figure 13-15, it will be necessary to loosen adjusting bolt, 4, Figure 13-20, to pivot the breakaway to the side.

The breakaway is held in the operating position by a spring-loaded ball, 5. To remove the spring, 6, or ball, remove the adjusting bolt cap, 7, and spacer, 8.

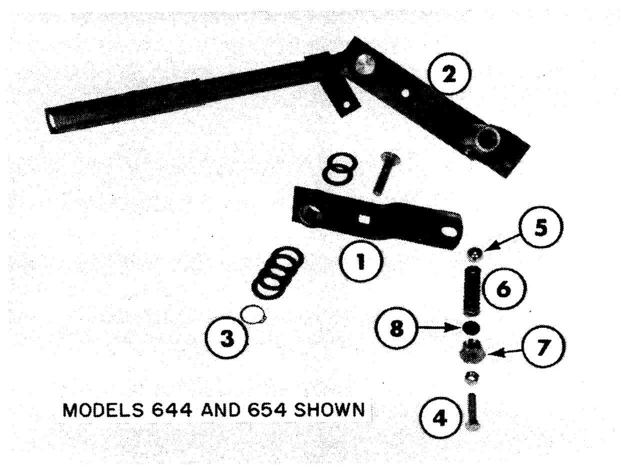


Figure 13-18

A4622-8

Remove the grease lines from the fittings, 14.

Remove the five cap screws from the mounting plate, 10, and remove the plate.

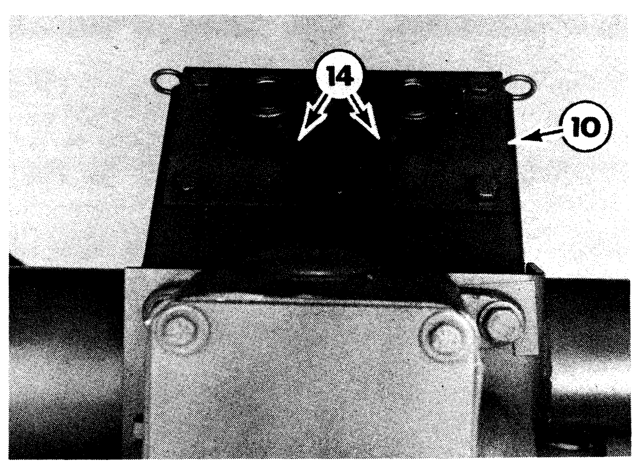


Figure 13-19

2377-9

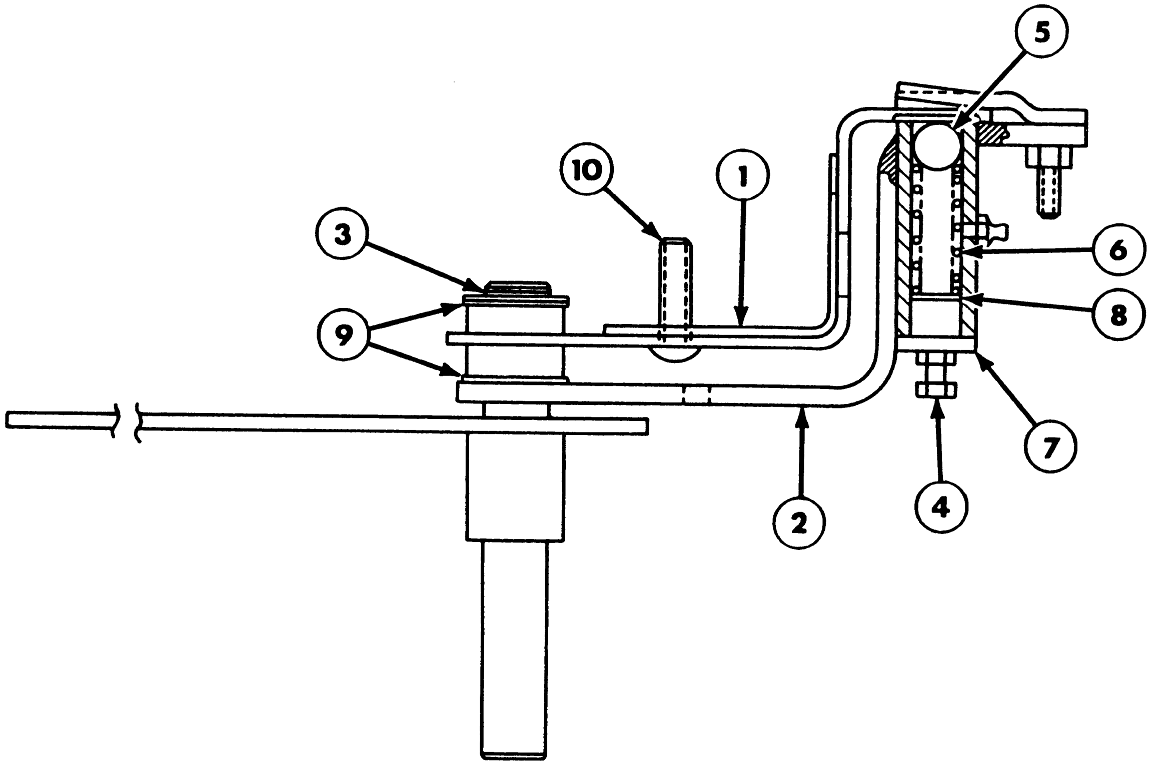


Figure 13-20

Assembly- Model 664 shown, the Models 644 and 654 are similar

If the mounting bracket has been removed from the baler, the pivot assembly can be assembled on the bench following the same instructions listed below and then installed as a unit.

Place the ball, 5, Figure 13-20, spring, 6, and spacer, 8, in the tube on the bracket and shaft weld assembly, 2.

Install the cap, 7.

Place a jam nut on the adjusting bolt, 4, and install in the cap. Do not tighten the adjusting bolt; it should be adjusted after the pivot assembly is completely reassembled and installed in the baler.

Place a 1/2″ by 2-1/4″ short square neck bolt, 10, through the breakaway. Install a nut on the end of the bolt to hold it in place until the assembly is installed on the baler and the drag link reconnected.

Place the breakaway, 1, on the shaft. Pivot the breakaway so it engages under the spring-loaded ball. The breakaway should lightly contact the top of the bracket or have up to 0.030″ (8 mm) clearance with the top. Use washers, 9, to adjust the breakaway height.

Use washers, 9, above the breakaway to reduce end play of the breakaway on the shaft to less than 0.030″ (8 mm) with snap ring, 3, installed.

Install the mounting bracket, 10, Figure 13-19, on the baler using five M10 x 20 cap screws and flanged nuts.

Attach the grease lines to the fittings, 14, on the mounting bracket hubs.

Install the shaft and breakaway assembly in the right hub in the mount and the left bracket and shaft in the left hub.

Position the twine tube brackets so they are parallel to each other. Install the keys in the shafts and install the gears, 6, as shown. The gears should be positioned on the shaft so they are within 0.030″ (0.8 mm) of the bottom of the mounting bracket when the shaft and bracket is against the top. Do not force the gears against the bracket as the shafts may not pivot freely. Install two 5/16″ x 1″ setscrews and jam nuts in the left gear. Install the spring bracket, 11, as shown using an M8 x 20 cap screw, washer and lock washer and a 5/16″ x 1-1/4″ setscrew and jam nut. Install a 5/16″ x 1″ setscrew in the right gear.

Install the twine tubes. Refer to the twine tube section.

Install the spring, 8.

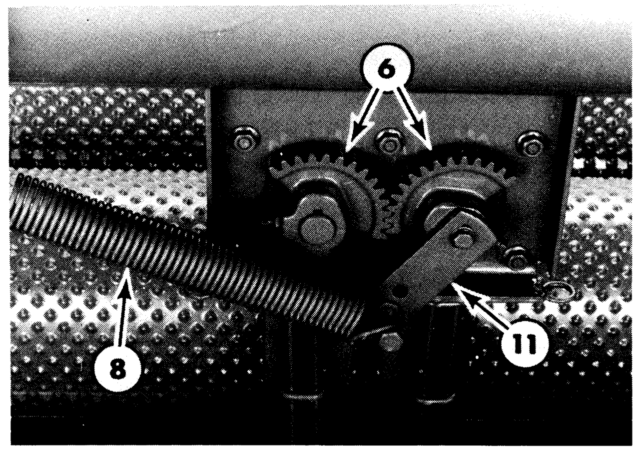


Figure 13-21

2377-11

Attach the drag link to the breakaway with two 1/2″ washers between the breakaway and rod end and install a locknut on the carriage bolt installed through the breakaway at 9.

Attach the indicator cable to the bracket using a washer and locknut, 15.

Place the eccentric, 13, on the left pivot shaft. Return the twine tubes to the home position. Rotate the eccentric to obtain a clearance of 1/64″ to 1/32″ (0.4 mm to 1.6 mm) between the eccentric and breakaway arm and tighten the setscrew.

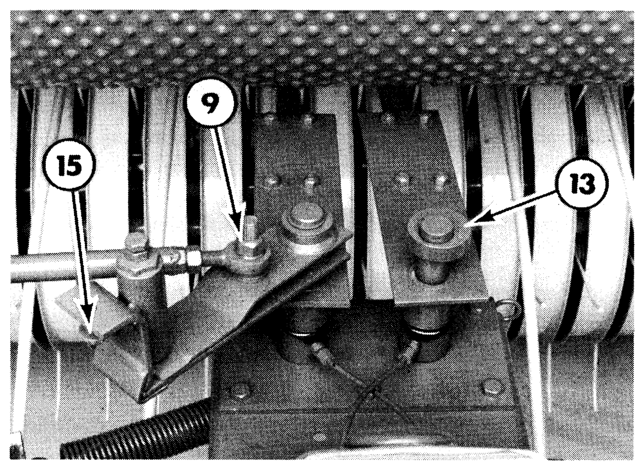


Figure 13-22

4621-6

REPLACING THE BREAKAWAY

Grab the end on one of the twine tubes and give it a quick pull to separate the breakaway as shown in Figure 13-15. This will make it easier to separate the breakaway from the shaft bracket.

Disassembly

Disconnect the drag link by removing the nut from the carriage bolt at 9, Figure 13-22.

Remove the breakaway, 1, Figure 13-23, from the shaft and bracket weld assembly, 2, by removing the snap ring, 3, and any washers that may be on the shaft. If the breakaway was not separated as shown in Figure 13-15, it will be necessary to loosen adjusting bolt, 4, to pivot the breakaway to the side.

The breakaway is held in the operating position by a spring-loaded ball, 5. To remove the spring, 6, or ball, remove the adjusting bolt cap, 7, and spacer, 8.

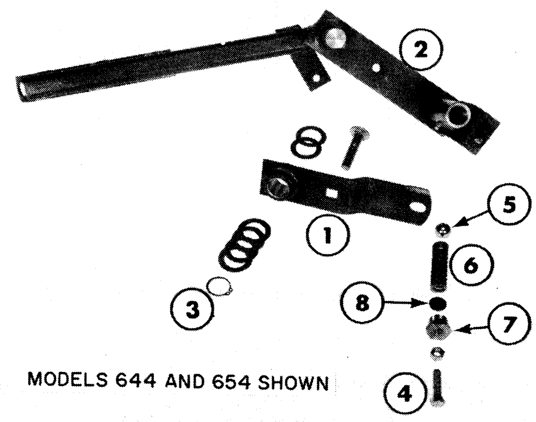


Figure 13-23

Assembly

Place the ball, 5, Figure 13-20, spring, 6, and spacer, 8, in the tube on the bracket and shaft weld assembly, 2.

Install the cap, 7.

Place a jam nut on the adjusting bolt, 4, and install in the cap. Do not tighten the adjusting bolt; it should be adjusted after the breakaway assembly is completely reassembled and installed on the baler.

Place a 1/2″ x 2-1/4″ short square neck bolt, 10, through the breakaway. Install a nut on the end of the bolt to hold it in place until the assembly is installed on the baler and the drag link reconnected.

Place the breakaway, 1, on the shaft. Pivot the breakaway so it engages under the spring-loaded ball. The breakaway should lightly contact the top of the bracket or have up to 0.030″ (8 mm) clearance with the top. Use washers, 9, to adjust the breakaway height.

Use washers, 9, above the breakaway to reduce end play of the breakaway on the shaft to less than 0.030″ (8 mm) with snap ring, 3, installed.

Attach the drag link to the breakaway with two 1/2″ washers between the breakaway and rod end and install a locknut on the carriage bolt installed through the breakaway at 9, Figure 13-22.

PIVOT LINK

The pivot link, 1, Figure 13-24, connects the actuator, 2, to the drag link, 3, Figure 13-25, that operates the twine tubes.

To remove the pivot:

Extend the actuator as far as possible to remove the spring pressure from the knife operating slide, 9, Figure 13-24, and spacer, 7.

Remove the locknut, washer and cap screw at 4, Figure 13-25, attaching the drag link end to the pivot link.

Remove the cap screw, spacer, washers and locknut at 5 attaching the magnet support to the link.

Remove the locknut, cap screw, 6, Figure 13-24, and spacer, 7, connecting the actuator to the link.

Remove the cotter pin from the bottom of pin, 8, and remove the pin.

Remove the pivot link from the bracket.

To install the pivot:

Place the pivot link, 1, Figure 13-24, in the bracket as shown. Coat pin, 8, with grease and install it through the bracket and link. Install a cotter pin in the bottom of the pin.

Place spacer, 7, under the link and to the rear of the knife operating slide, 9. Install the cap screw and locknut at 6.

Place the spacer inside the magnet support and install the cap screw and locknut at 5, Figure 13-25, with a flat washer under both the nut and bolt head.

Attach the drag link to the pivot using a cap screw, washer and locknut at 4.

Grease the link using a grease gun.

Check the twine tube adjustment and adjust if required. There should be approximately 2″ (50 mm) between the tubes when the actuator is fully extended.

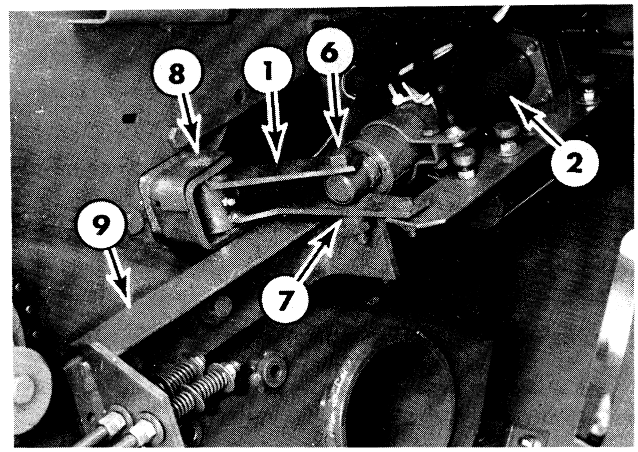


Figure 13-24

1085-5

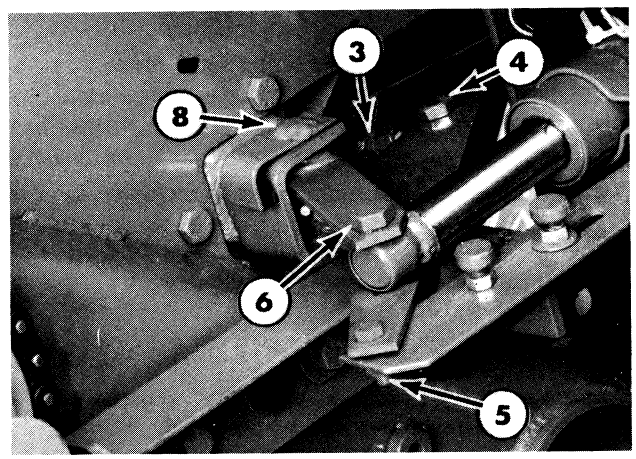


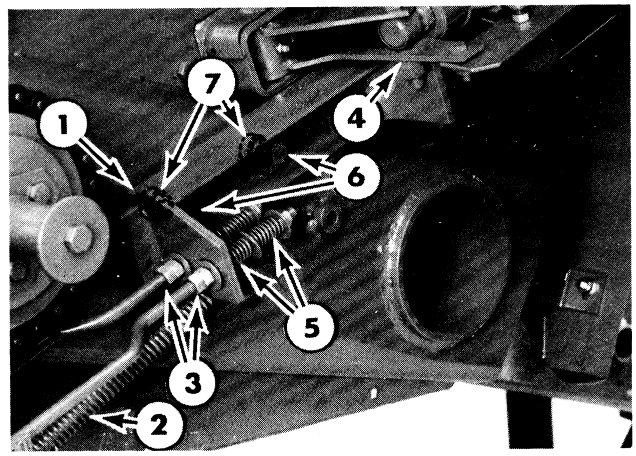
Figure 13-25

1085-11

KNIFE OPERATING SLIDE

The knife operating slide, 1, is moved to the knife open position by spring, 2, when the actuator is extended. The tab on the slide pushes on the nuts, 3, on the knife actuating rods to open the knives. When the actuator is retracted, the spacer, 4, contacts the tab on the slide and pulls it to the home (cut) position. The tab on the other end of the slide compresses the springs, 5, on the knife actuating rods and moves the knives to the cut position.

The knife operating slide must move freely. The slide is held in position on the baler by the large washers on the two cap screws, 6, and slides between the shoulder on the spacers, 7, and the washers.



1085-5

Figure 13-26

To remove the slide:

Extend the actuator approximately halfway.

Remove spring, 2.

Remove the springs, 5, from the knife actuating rods.

Remove the cap screws, 6, and the lock washer, large washer and spacer, 7, under them.

Lower the slide and pull it off the knife actuating rods.

To install the slide:

Place the slide, 1, over the knife actuating rods and lift it into position. The spacer, 4, must be to the rear of the tab on the slide.

Place a stepped spacer, 7, behind the slide with the smaller diameter facing the slide. Place the slide over the small diameter of the spacer and install the large washer, lock washer and cap screw, 6, on the outside of the slide. Do not tighten the cap screw. Repeat for the other stepped spacer and then tighten both cap screws.

Install the springs, 5, on the knife actuating rods in the following sequence: washer, spring, washer, spring, washer, nut.

Retract the actuator to the home position.

Adjust the nuts on the knife actuating rods to compress the springs, 5, to a total length of 2-1/2″ (64 mm). Adjust the nuts, 3, so there is a gap of 1/8″ (3.5 mm) between the washer and the tab.

NOTE: If the washers between nuts, 3, and the slide are against the slide with the actuator retracted, the twine may not be cut as the springs, 5, cannot pull the knives tight against the striker plates.

TWINE KNIVES AND SUPPORTS

The twine knives, 1, Figures 13-27 and 13-28, are held to the supports using two carriage bolts, 2, and flanged nuts. The knives must be kept sharp and make contact with the striker plates, 3, for their full length. The right knife support, 4, Figure 13-27, and the left knife support, 5, Figure 13-28, must pivot freely and independently of each other to cut and hold each twine.

The left knife support, 5, Figure 13-28, is operated by a shaft, 6, Figure 13-27, that goes through the right support, 4, and is connected to the outer knife operating rod, 7, Figure 13-29.

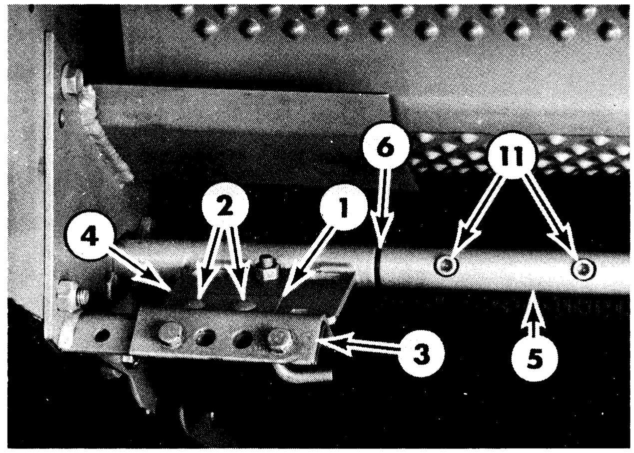


Figure 13-27

1486-6

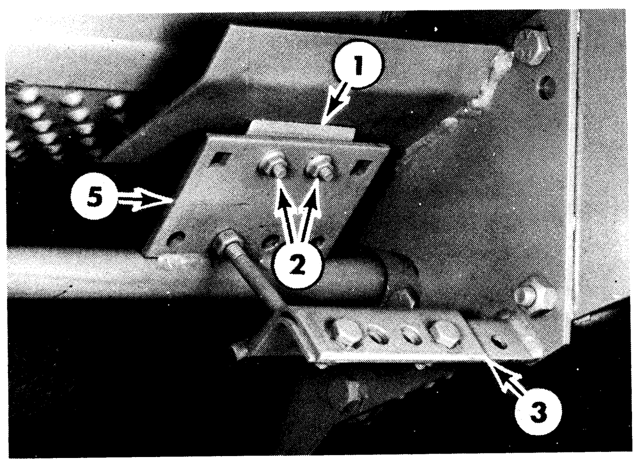


Figure 13-28

1486-10

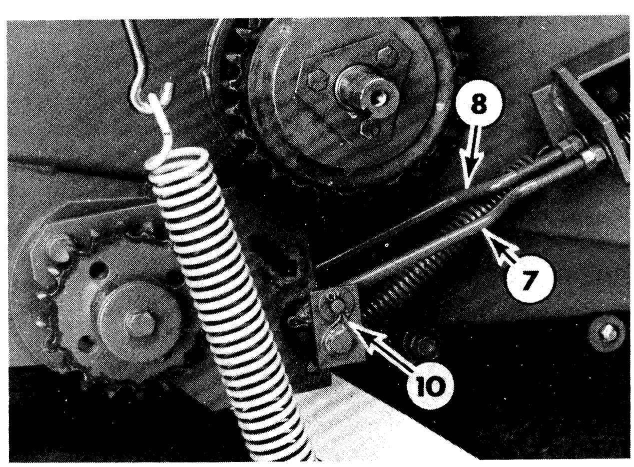


Figure 13-29

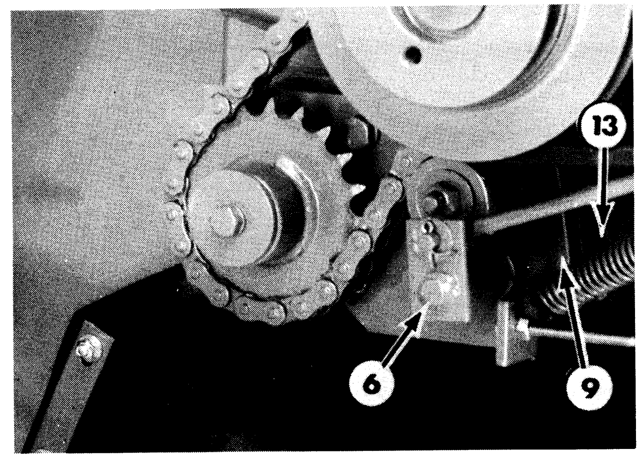
1356-10

The right support is connected to the inner knife operating rod, 8, by a clamp, 9, on the support.

Replacing a Knife

To replace a knife, 1, Figures 13-27 and 13-28, remove the flanged nuts from the two carriage bolts, 2, and remove the knife.

Place the new knife (or other edge of the original knife), 1, with the bevel down toward the striker plate, 3, and install the two carriage bolts, 2. Start the two flanged nuts on the carriage bolts but do not tighten completely. Position the knife so it makes contact with the striker plate for the full length of the knife and tighten the flanged nuts. If the knife cannot be moved enough to fully contact the striker plate, 3, loosen the striker plate hardware and reposition the plate.



2378-1

Figure 13-30

Sharpening a Knife

The twine knife has two sharpened cutting edges. When one edge is dull, the knife can be reversed to use the second edge following the instructions to replace a knife.

When both edges are dull, the knife can be sharpened using a file or grinder. Be sure to maintain the original bevel angle as shown when sharpening the knife. The sharpened edge must also be straight to ensure that the knife will cut for the full length.

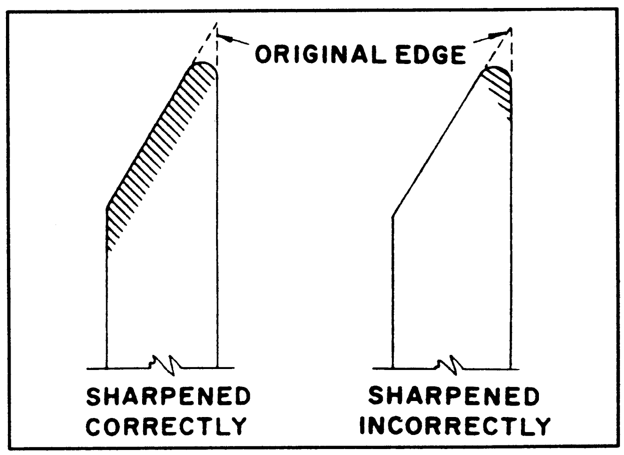


Figure 13-31

Replacing the Knife Supports and Bearings

Disassembly

Disconnect the knife operating rods, 7 and 8, Figure 13-29, by removing the cotter pins, 10, and washers from the end of the rod and then sliding the rods out of the right knife support clamp and the left operating shaft.

Remove the two socket-head cap screws, 11, Figure 13-27, from the left support and operating shaft.

Pull the left operating shaft, 6, Figure 13-30, out of the supports.

Remove the bearing, 12, from the left support by removing the cotter pin through the support and two cap screws.

Remove the right support operating clamp, 9, Figure 13-30, from the support.

Remove the right support, 4, Figure 13-27, by sliding it toward the center of the baler.

Remove the right bearing, 13, Figure 13-30.

Assembly

Attach the right bearing, 13, Figure 13-30, to the side sheet.

Place the right support, 4, Figure 13-27, through the baler side sheet and the bearing.

Place the operating clamp, 9, Figure 13-30, on the support.

Place the left support, 5, Figure 13-28, through the side sheet. Place the left bearing, 12, Figure 13-32, on the support and install a cotter pin through the support.

Place a washer on the left operating shaft, 6, Figure 13-27, coat the shaft with an antiseize-type grease and place the shaft through the right support, 4. Place the left support, 5, over the operating shaft and install the two socket-head cap screws, 11, and locknuts.

Attach the left bearing, 12, Figure 13-32, to the side sheet.

Align the hole for the operating rod in the clamp, 9, Figure 13-30, with the hole for the operating rod in the left operating shaft, 6. Tighten the cap screw to lock the clamp, 9, to the right support.

Place the knife operating rods, 7 and 8, Figure 13-29, through the clamp and left operating shaft and install a washer and cotter pin, 10, at the end of each rod.

Retract the actuator to the home position.

Adjust the nuts on the knife actuating rods to compress the springs, 5, Figure 13-26, to a total length of 2-1/2″ (64 mm). Adjust the nuts, 3, so there is a gap of 1/8″ (3.5 mm) between the washer and the tab.

NOTE: If the washers between nuts, 3, and the slide are against the slide with the actuator retracted, the twine may not be cut as the springs, 5, cannot pull the knives tight against the striker plates.

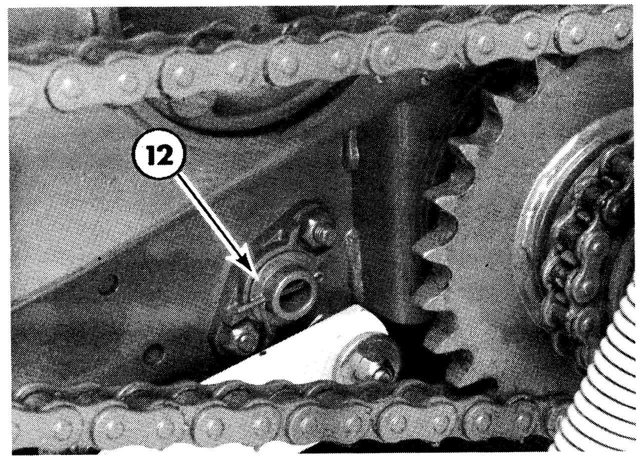


Figure 13-32

A4622-7

NET WRAPPER

This section covers the mechanical portion of the net wrapping system. Refer to Section 14 for the electric portion of the Bale Command Plus system.

NET WRAPPING CYCLE OPERATION

When the actuator is extended, the duckbill will be moved rearward to insert the net between the upper dimpled roll and the bale. After the net is grabbed by the bale, the actuator will move the duckbill to the precut position. When the selected amount of net is wrapped on the bale, the duckbill will be moved to the home position. As the duckbill nears the home position, the knife will drop and cut the net.

Figures 13-33, 13-34, 13-35, and 13-36 illustrate how the various components move during the wrapping cycle. The items in the figures are identified as follows:

1 Actuator
2 Duckbill
3 Follower roll
4 Upper dimpled roll
5 Brake
6 Counter roll
7 Knife

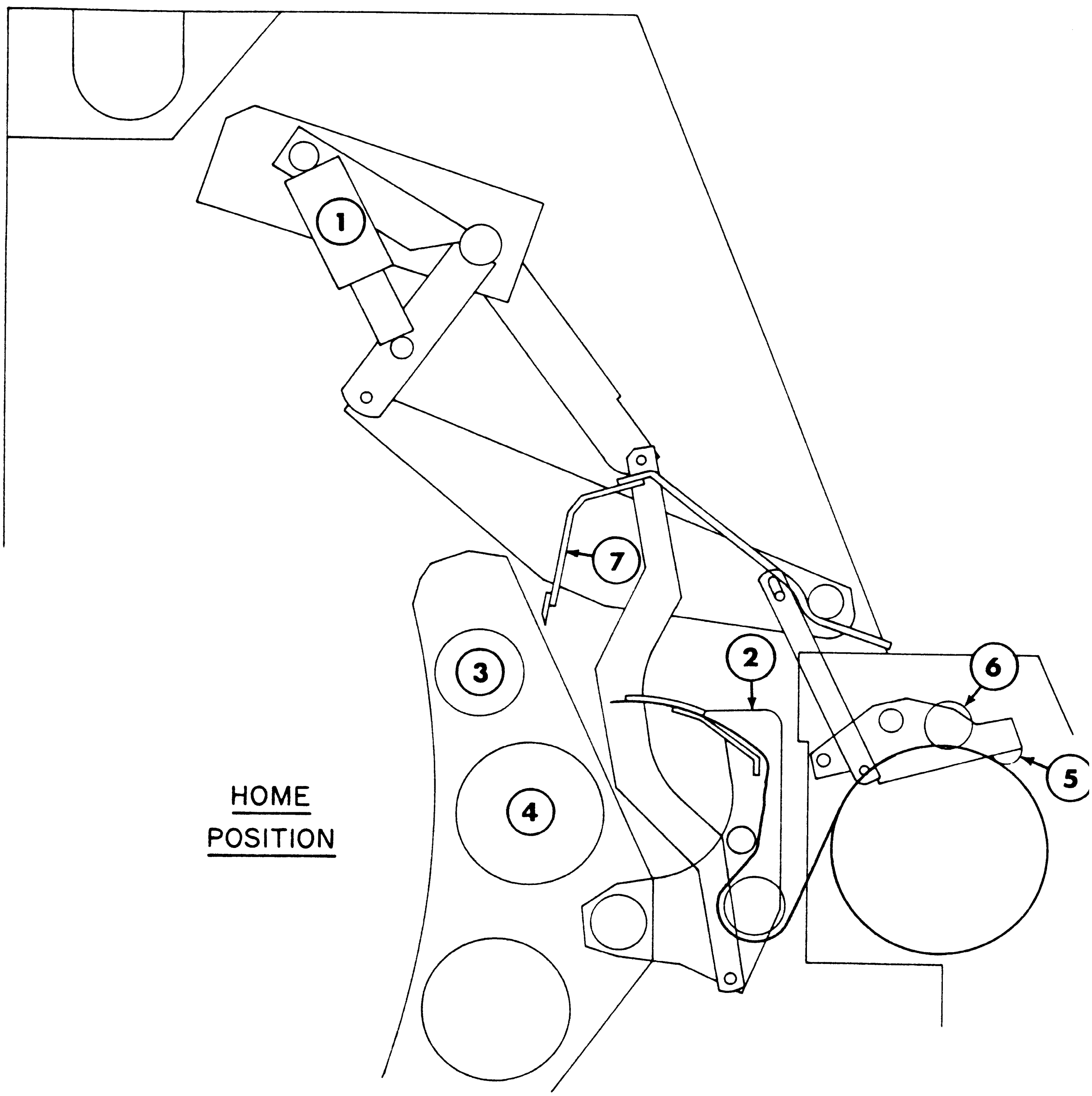


Figure 13-33

Figure 13-33 shows the home position of the components when the cycle is ready to start. The actuator ,1, is retracted. The duckbill, 2, is all the way forward. The follower roll, 3, and the pivoting roll assembly have moved to the full bale position. The brake, 5, is against the roll of net. The counter roll, 6, is stationary. The knife, 7, is latched in the up position.

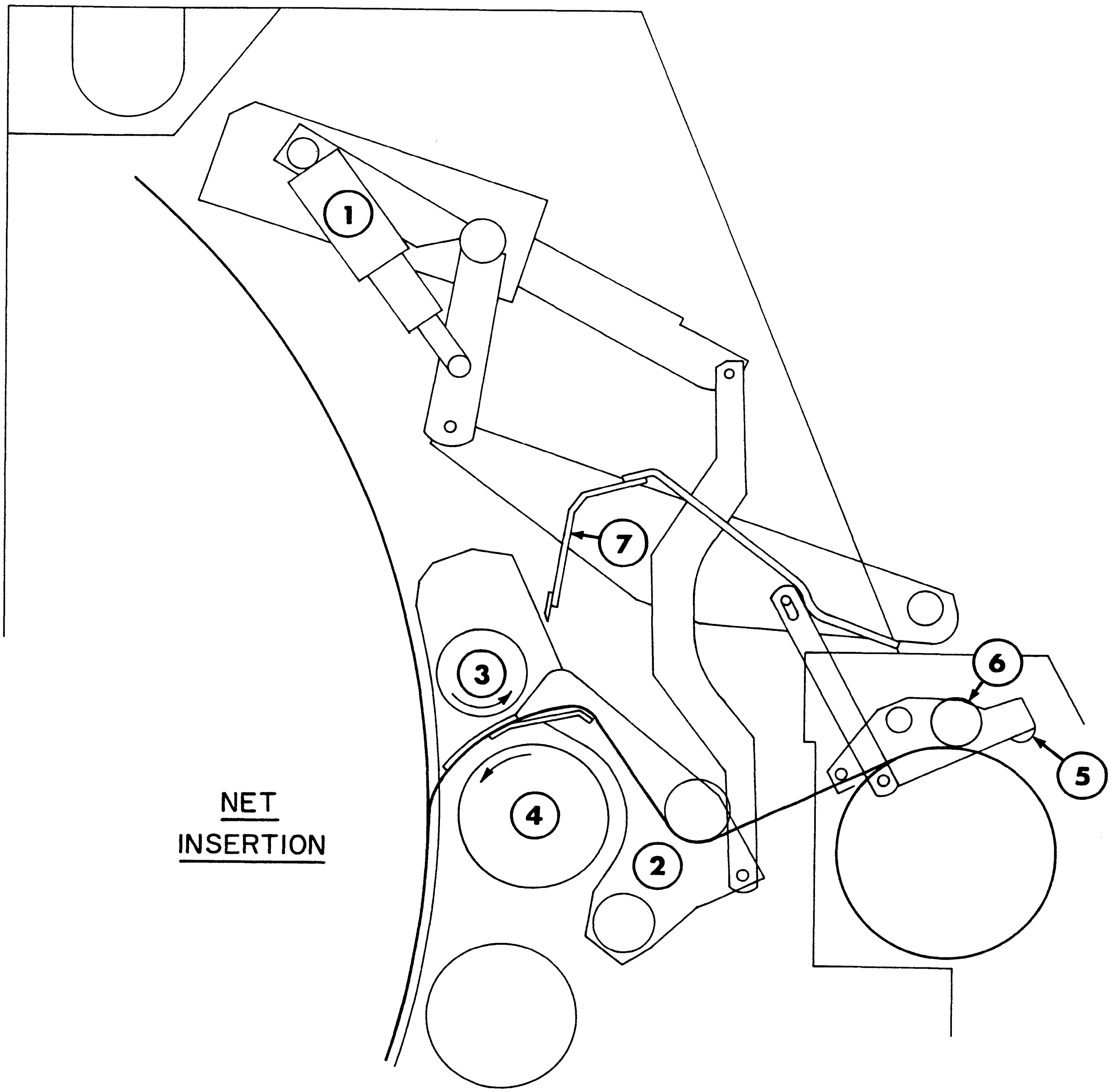
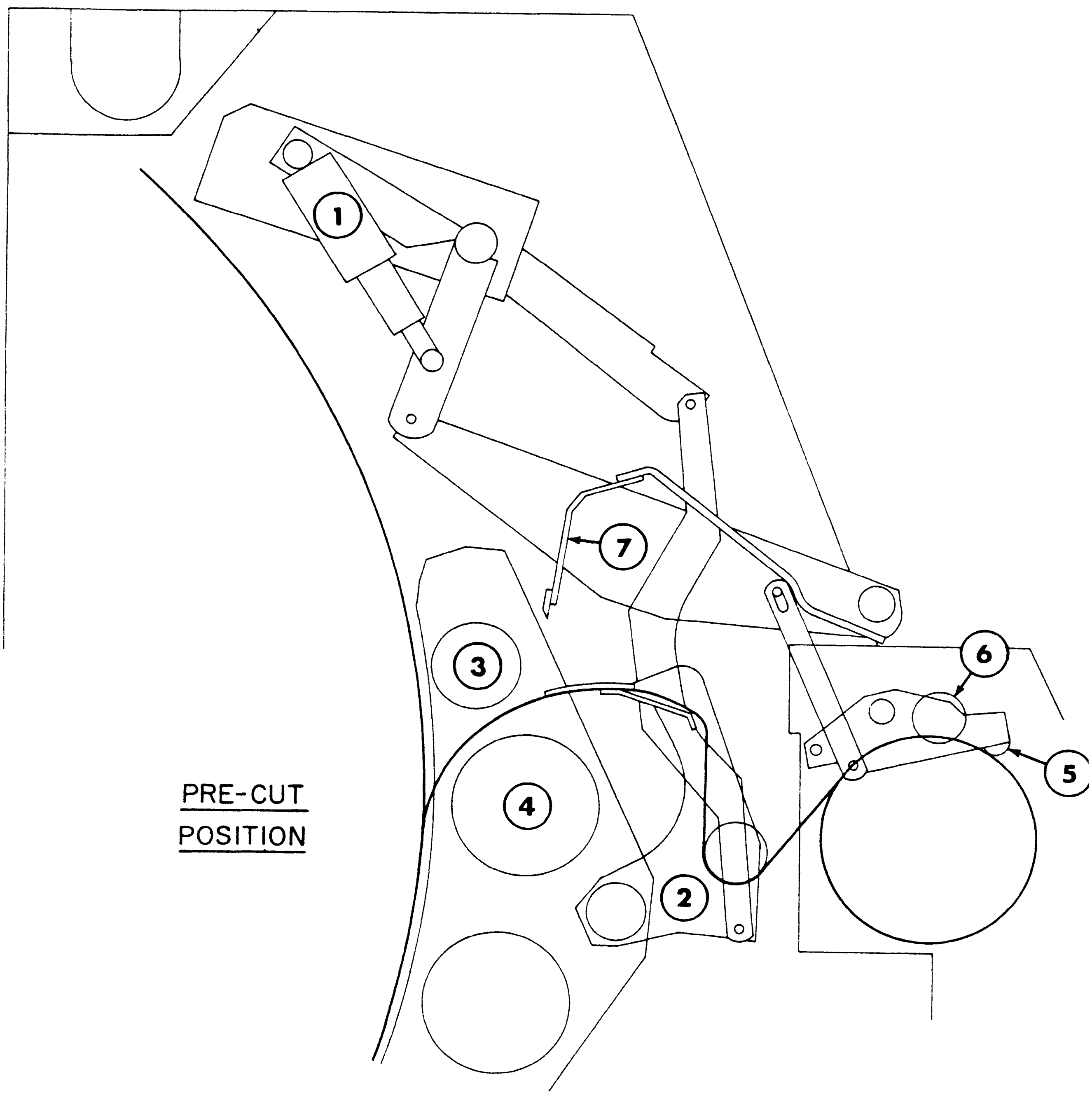


Figure 13-34

Figure 13-34 shows the net insertion position. The actuator, 1, has extended. The duckbill, 2, has moved all the way to the rear to insert the net between the follower roll, 3, and upper dimpled roll, 4. The brake, 5, is raised off the roll of net. As soon as the bale grabs the net and starts to pull it off the roll, the counter roll, 6, starts to rotate and send a signal to the controller. The knife, 7, stays in the latched position.



PRE-CUT POSITION

Figure 13-35

Figure 13-35 shows the precut position. As soon as the controller receives the "net start" signal from the rotating counter roll, 6, it retracts the actuator, 1, to move the duckbill, 2, to the precut position to apply the selected amount of net to the bale. At the same time, the brake, 5, is applied to the roll of net so it spreads quickly and comes off the roll at a uniform rate. The counter roll will continue to rotate and send signals to the controller. The knife, 7, stays in the latched position.

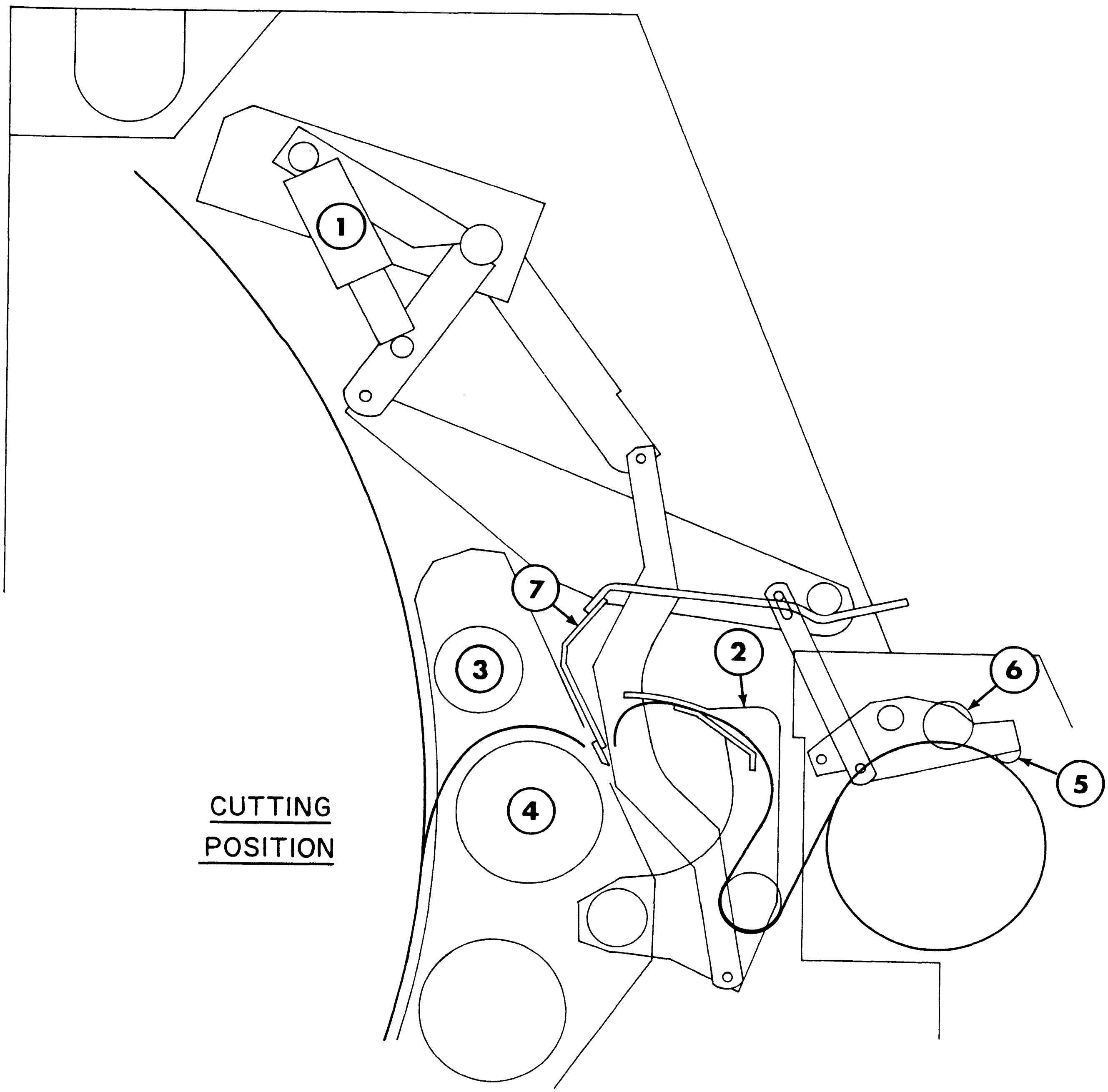


Figure 13-36

Figure 13-36 shows the cut position. After the controller receives the correct amount of signals from the counter roll, 6, the actuator, 1, will be moved to the home position. Just before the actuator reaches the home position, the knife, 7, will be released and drop down to cut the net. The brake, 5, will remain in contact with the roll of net and the counter roll, 6, will stop rotating after the net is cut. When the bale is ejected, the linkage from the tailgate will return the knife to the raised position and reengage the latch so it is ready for the next cycle.

KNIFE SAFETY LATCH

The knife safety latch, 1, Figures 13-37 (Model 644) and 13-38 (Models 654 and 664), should be engaged as shown to hold the knife up whenever you are working near the net wrap system. When properly engaged, the latch will keep the knife from dropping and possibly causing either personal injury or damage to baler components.

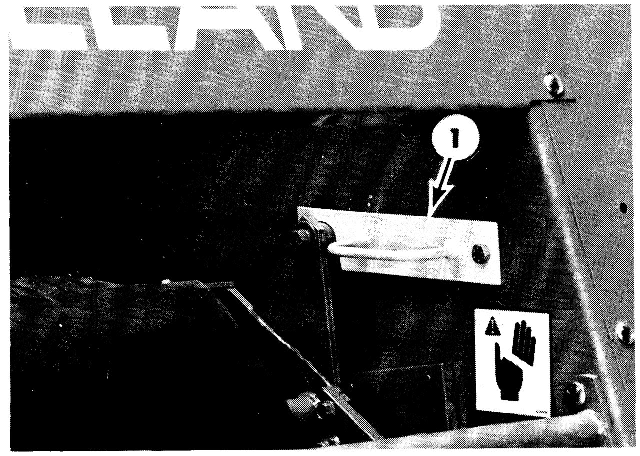


Figure 13-37

1630-11

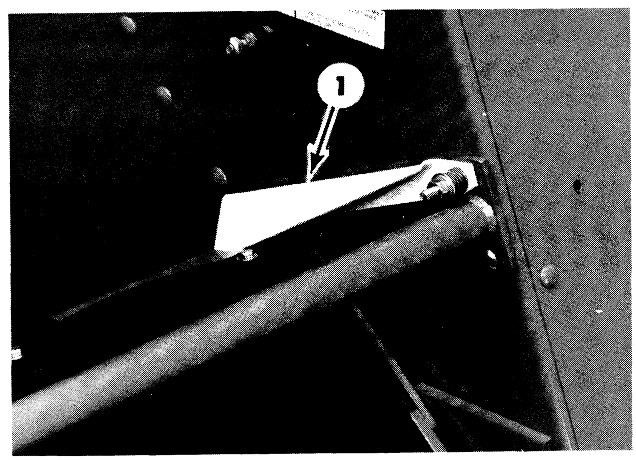


Figure 13-38

1301-7

The latch must be released and moved to the storage position as shown in Figure 13-39 (Model 644) or Figure 13-40 (Models 654 and 664) for the knife to drop when the wrapping cycle is completed.

CAUTION; DO NOT WORK NEAR THE KNIFE OR DUCKBILL UNLESS THE LATCH IS ENGAGED TO HOLD THE KNIFE AS SHOWN IN FIGURES 13-37 AND 13-38.

NET WRAPPER ADJUSTMENTS

Knife Safety Latch Spring

The locknut on the latch mounting bolt, 2, Figure 13-39 or Figure 13-40, should be tightened to compress the spring and hold the latch in the raised position.

NET ROLL BRAKE

The net roll brake applies pressure to the net to keep the roll from turning except when wrapping a bale and to be sure that the net spreads quickly and is held tightly so the net is cut cleanly.

The brake is released during insertion so that it is easier for the bale to grab the net. As the duckbill is moved to the pre-cut position the brake is reapplied.

A roller contacted by the cam operated by the net actuator controls the movement of the brake.

Model 644

The roller, 1, should be adjusted in the center of the slot.

If the net does not spread quickly to full bale width, move the roller rearward to apply the brake to the net roll earlier.

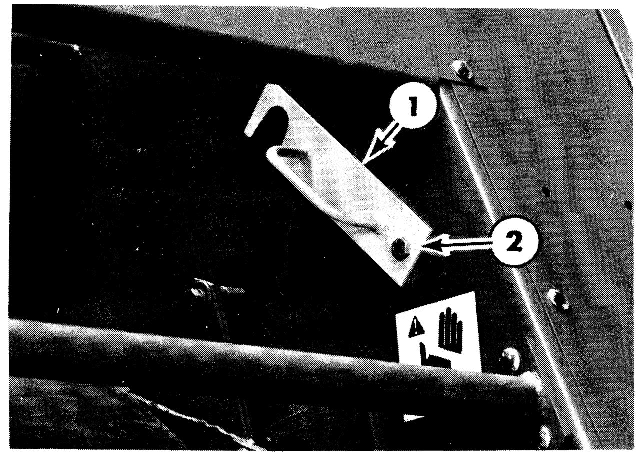


Figure 13-39

1630-9

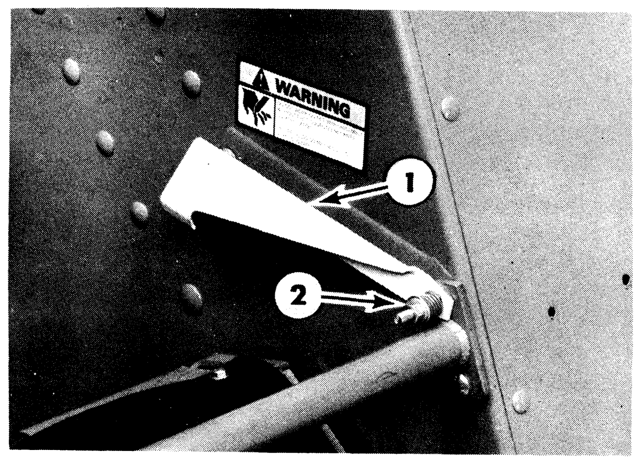


Figure 13-40

1301-8

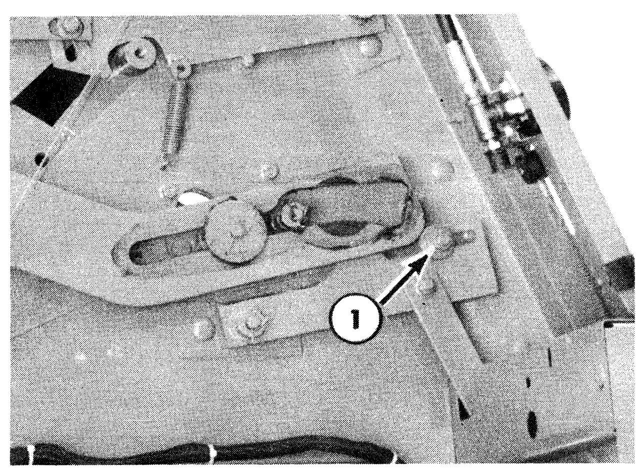


Figure 13-41

A4101-15

Models 654 and 664

The roller that controls the brake on the Models 654 and 664 is shown at 1.

The roller is adjusted in the center of the slot. This will be correct for most crop situations. If the net does not spread quickly to full-bale width, adjust the roller rearward. This engages the net brake quicker, as the duckbill moves forward to the precut position.

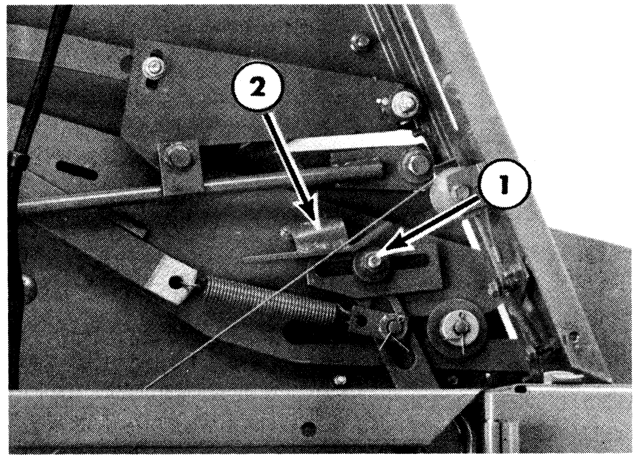


Figure 13-42

A3973-8

NET ROLL BRAKE TENSION

Springs, 1, at each end of the brake, 2, apply tension to the roll of net. The springs should be attached to the rear pin, 3, when using black net and attached to the front pin, 4, when using white net. If additional pressure is required, the bottom of the springs can be moved forward.

NOTE: All Models 644 and 654 balers have two springs at each end of the brake bar.

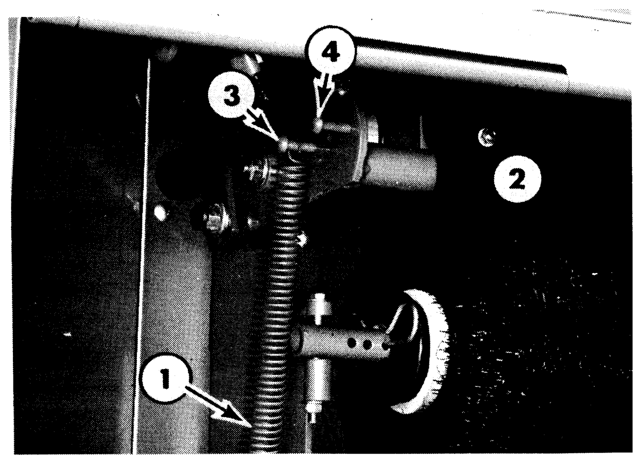


Figure 13-43

1636-3

DUCKBILL OVERRIDE SPRING

The duckbill override spring, 1, Figure 13-44 (Model 644) or 13-45 (Models 654 and 664), insures that the duckbill is fully inserted when making various size bales.

The spring on all models should be adjusted to a length of 2-3/4″ (70 mm).

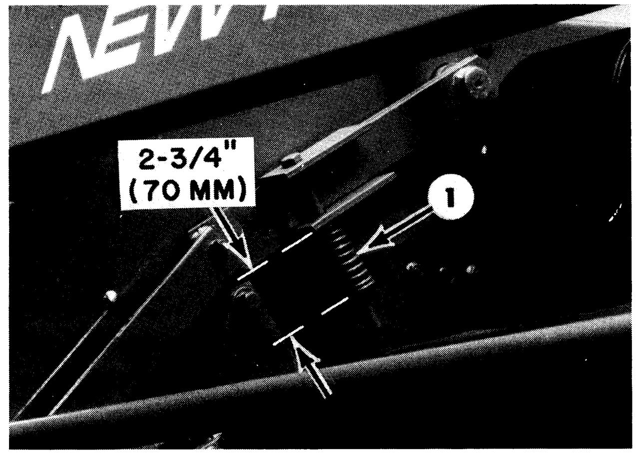


Figure 13-44

1633-10

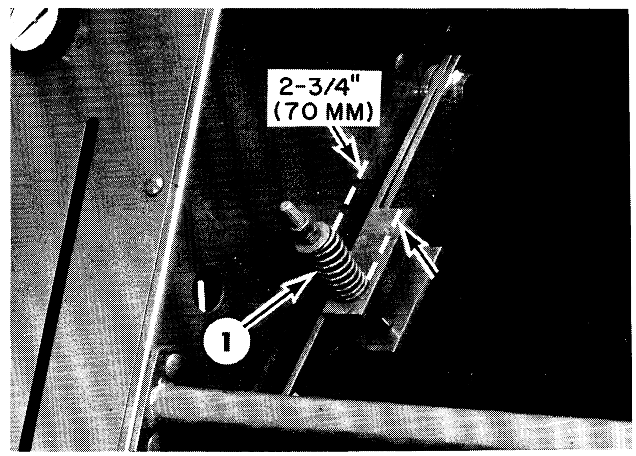


Figure 13-45

2363-9

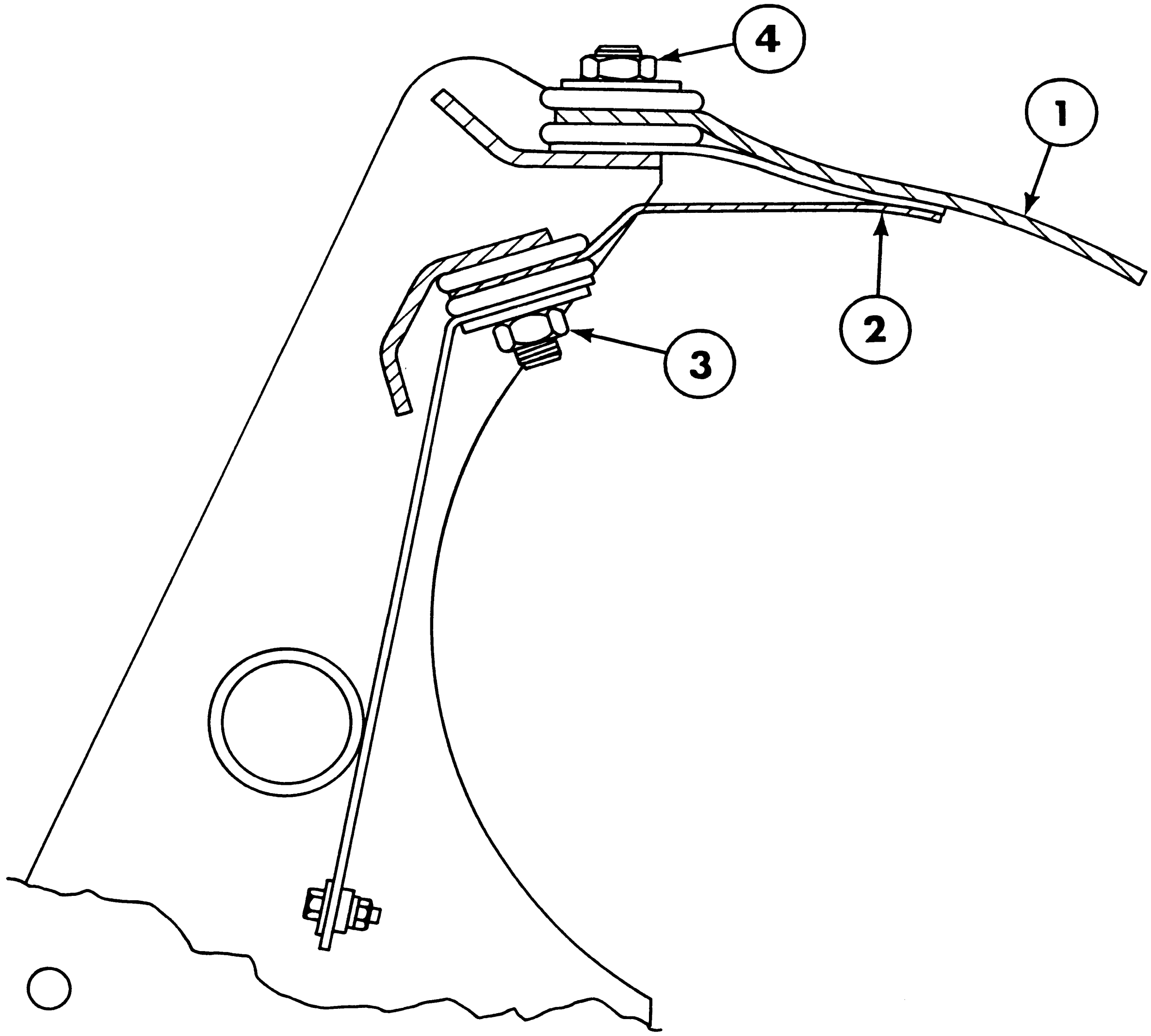


Figure 13-46

DUCKBILL BAFFLES

The baffles, 1 and 2, on the duckbill apply pressure to the net to hold it in the duckbill. If the tension is too low, the net may pull back out of the baffles during bale formation or when the duckbill moves to insert the net. If the tension is too high, the net may be torn during insertion or may not start wrapping on the bale.

Adjust the tension on the bottom baffle, 2, so there are two or three bolt threads visible at 3.

Adjust the tension on the top baffle, 1, so there is one bolt thread visible at 4.

CAUTION: BEFORE INSPECTING OR ADJUSTING THE DUCKBILL, BE SURE THE KNIFE SAFETY LATCH, 1, FIGURE 13-37 OR 13-38, IS ENGAGED TO SECURE THE KNIFE.

KNIFE LATCH

The knife should be held in the raised position when the duckbill inserts the net and while it is in the precut position. The latch should release the knife just before the actuator reaches the home position.

The knife should drop freely when released. If the knife drops slowly, a ragged cut will occur. When the latch is properly adjusted, there will be approximately 2″ (52 mm) of net sticking out of the duckbill after the net is cut. If the knife drops too soon, there may not be enough net available to start wrapping the next bale. If the knife is adjusted for too long a tail, the knife may not always release when the actuator is fully retracted.

NOTE: The knife will drop down onto the duckbill if released with the baler empty or with less than a 42″ (105 mm) bale in the chamber.

Model 644

Before adjusting the latch, 1, check to be sure that the actuator, 2, is fully retracted.

Adjust the latch by repositioning the spacer, 3, in the slot in latch, 1. If the knife does not release consistently, move the spacer, 3, lower in the slot to advance the knife release. If the knife contacts the duckbill with over a 42″ (105 mm) bale in the bale chamber or if the net tail is too short, move the spacer, 3, up in the slot to retard the knife release.

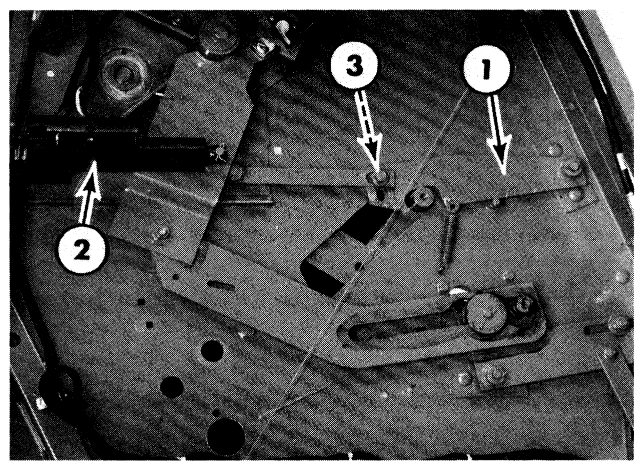


Figure 13-47

A4101-14

Models 654 and 664

Adjust the latch by repositioning the spacer, 3, in the slot in latch, 1. If the knife does not release consistently, move the spacer, 3, lower in the slot to advance the knife release.

If the knife contacts the duckbill with over a 42" (105 mm) bale in the chamber or if the net tail is too short, move the spacer, 3, up in the slot to retard the knife release.

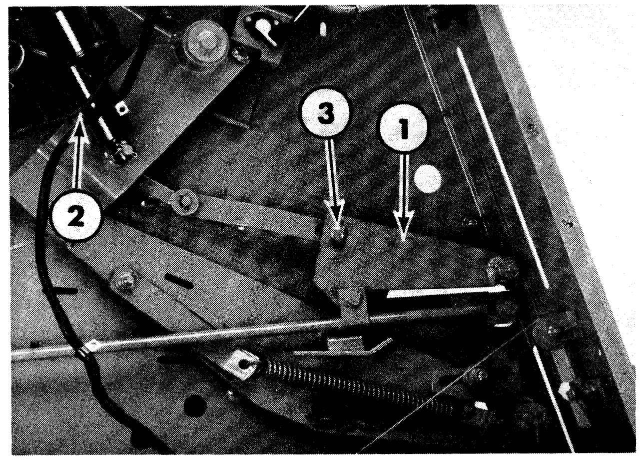


Figure 13-48

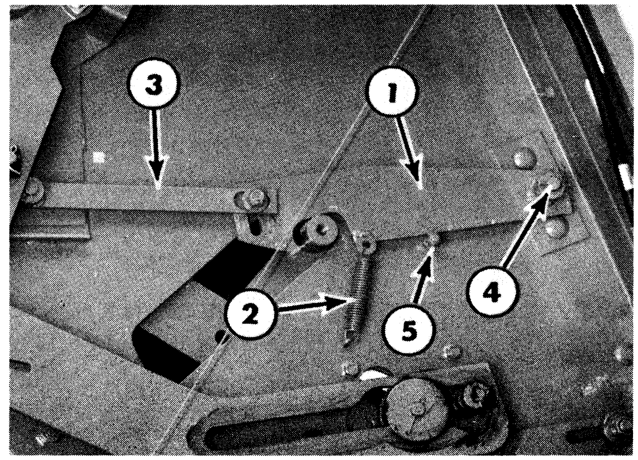
A4640-8

NET WRAPPER REPAIR

KNIFE LATCH

Model 644

The knife latch, 1, holds the knife in the raised position until the actuator moves from the precut to home position. The knife should be released just before the actuator reaches the home position. A stop bolt, 5, keeps the latch from dropping too far if the actuator is extended when the knife is not latched. If the latch drops too far, it could be damaged when the knife is reset.



A4101-14

Figure 13-49

Disassembly

Engage the knife safety latch to hold the knife up.

Disconnect the spring, 2, from the latch.

Remove the carriage bolt and spacer attaching the latch to the operating link, 3.

Remove the washer and cotter pin at 4 and remove the latch from its pivot shaft.

If the operating link, 3, must be removed, refer to "Duckbill Operating Pivot Linkage" later in this section.

Assembly

Install the latch, 1, on the pivot shaft and secure with a 1/2″ washer and 1/8″ x 1-1/8″ cotter pin at 4.

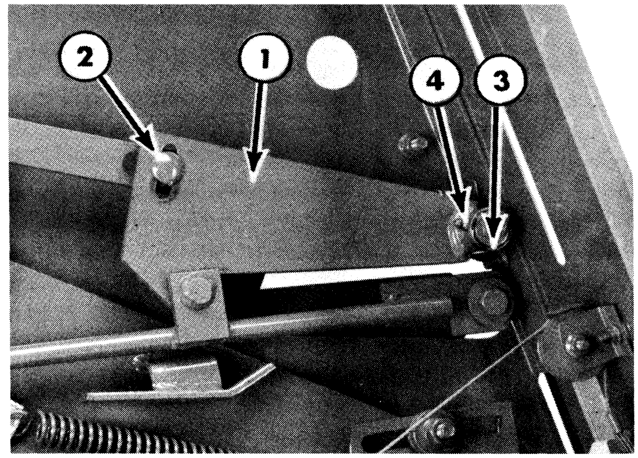
Connect the spring, 2, to the latch.

Attach the latch to the operating link, 3, using an M10 x 30 carriage bolt, spacer, washer and locknut. Check to be sure that the actuator is fully retracted. Adjust the latch by repositioning the spacer in the slot in latch, 1, so that the knife is released just before the actuator reaches the home position. Move the spacer lower in the slot to advance the knife release. Move the spacer up in the slot to retard the knife release.

If the stop bolt, 5, was removed, it should be installed and adjusted to keep the latch above the center of the latch spacer on the knife.

Models 654 and 664

The knife latch, 1, holds the knife assembly in the raised position until the actuator moves from a wrapping or precut position to the home position. The knife should release just prior to the actuator reaching the completely retracted or home position.



A4640-8

Figure 13-50

Disassembly

Engage the knife safety latch to hold the knife up as shown in Figure 13-38.

Remove the carriage bolt and spacer attaching the latch to the operating link, 2.

Remove the self-locking nut and washer at 3. Disengage the tension spring, 4, from the top of the latch and remove the latch. The tension spring, stepped spacer, and carriage bolt can now be removed if required.

Assembly

Install the carriage bolt, 6, into the main frame, followed by the stepped spacer, 5, and tension spring, 4.

Install the latch, 1, onto the carriage bolt and spacer with the latch spring, 4, on top. Replace the flat washer and locknut, 3.

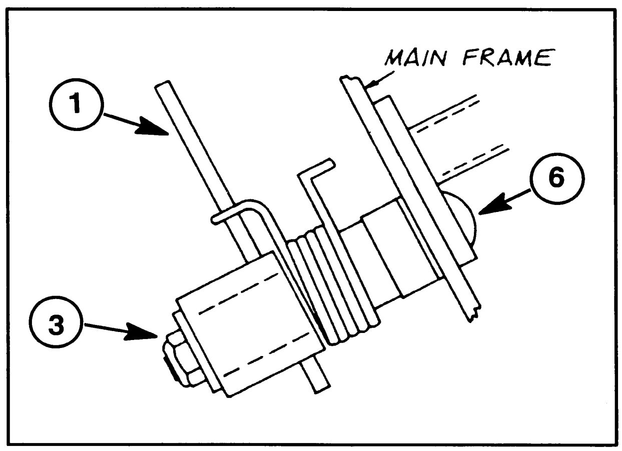


Figure 13-51

NOTE: The carriage bolt is in a slot on the main frame. Better free fall of the knife occurs when the latch pivot belt is located to the rear portion of the slot.

Attach the latch to the operating link, 2, Figure 13-50, using a M10 x 30 carriage bolt, spacer, washer and locknut. Check to be sure the actuator is fully retracted. Adjust the latch by positioning the spacer in the slot in latch, 1, so the knife is released just before the actuator reaches the home position. Move the spacer lower in the slot to advance the knife release. Move the spacer up in the slot to retard the knife release.

Use the Extend and Retract keys on the Bale Command Plus operator's panel to check the knife latch adjustments.

KNIFE RESET LINKAGE

The knife is reset when the tailgate is opened and closed to eject the bale.

Model 644

When the tailgate is opened, a heavy spring, 1, Figure 13-52, pulls up on the pivot plate, 2. The end of the slot in the plate contacts the spacer on the rear of link, 3, and moves the knife, 4, to the home position. When the tailgate is closed, the bracket, 5, Figure 13-53, on the tailgate contacts the bearing, 6, on the pivot plate, 2, and moves it to the reset position so the knife link, 3, can move in the slot when the knife is released.

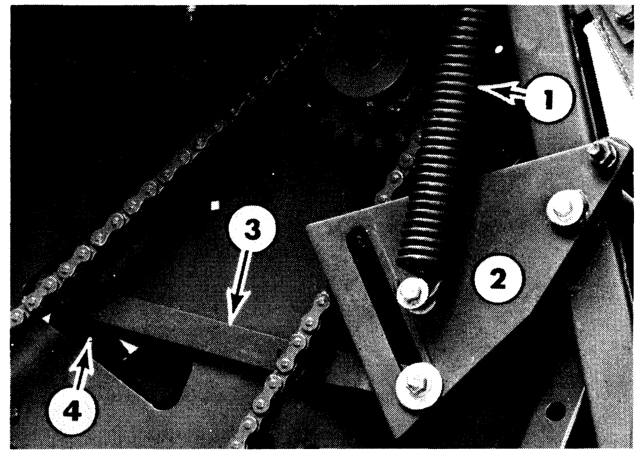


Figure 13-52

1635-7

Disassembly

Remove the cap screw, spacer and washer at 7 from the rear of link, 3.

Remove the cap screw and spacer at 8 to remove the front of the link from the knife mount.

Open the tailgate and engage the lockout.

Remove the cap screw and spacers at 9 and remove the spring, 1.

Remove the cap screw and washer at 10 to remove the pivot plate, 2.

Remove the bearing, 6, from the pivot plate.

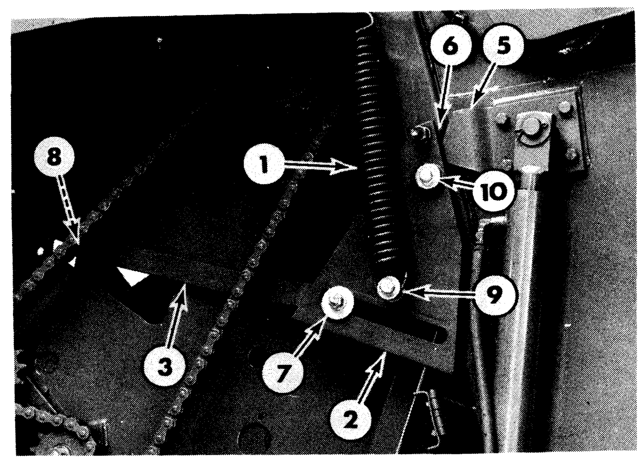


Figure 13-53

1635-9

Assembly

Attach the bearing, 6, to the pivot plate using a hardened washer and 5/8″ UNF nut. Do not tighten the nut until the bearing is adjusted after the knife reset link, 3, is installed.

Attach the pivot plate, 2, to the frame using a 1-3/8″ OD washer and M10 x 30 cap screw at 10.

Open the tailgate and engage the lockout.

Attach the spring, 1, to the frame.

Attach the spring, 1, to the plate using a M12 x 60 cap screw, lock washer, and nut at 9. A 3/4″ (19 mm) long spacer, washer, 1/2″ (12.7 mm) long spacer, and washer, should be installed in the order listed on the outside of the pivot to hold the spring away from the pivot plate.

Close the tailgate.

Attach a 13/32″ (10.3 mm) long spacer to the rear of link, 3, using an M12 x 40 cap screw, 2″ (50 mm) OD washer, and flanged nut at 7.

Attach the link to the knife using a 13/32″ (10.3 mm) long spacer, washer, lock washer, and M10 x 30 cap screw at 8.

The mounting stud on bearing, 6, includes an eccentric that can be used to adjust the bearing location so that with the tailgate closed the spacer at 7 is not against the front of the slot in the pivot plate.

Models 654 and 664

When the tailgate is opened, a heavy spring, 1, Figure 13-54, pulls up on the pivot plate, 2. The end of the slot in the plate contacts the spacer on the rear of latch rod, 3, and moves the knife, 4, to the home position. When the tailgate is closed, the bracket, 5, on the tailgate contacts the bearing, 6, on the pivot plate, 2, and moves it to the reset position so the knife latch rod, 3, can move in the slot when the knife is released.

Disassembly

Remove the cap screw, spacer, and washer at 7 from the rear of link, 3.

Open the tailgate and engage the lockout.

Remove the cap screw and spacers at 8 and remove the spring strap, 9, and spring, 1.

Remove the cap screw and washer at 10 to remove the pivot plate, 2.

Remove the bearing, 6, from the pivot plate.

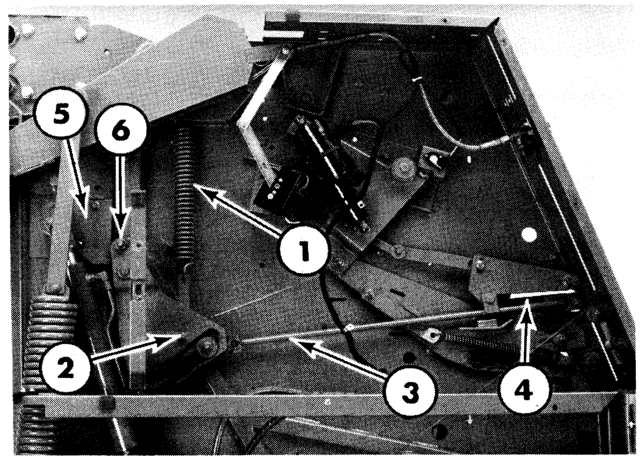


Figure 13-54

A4640-2

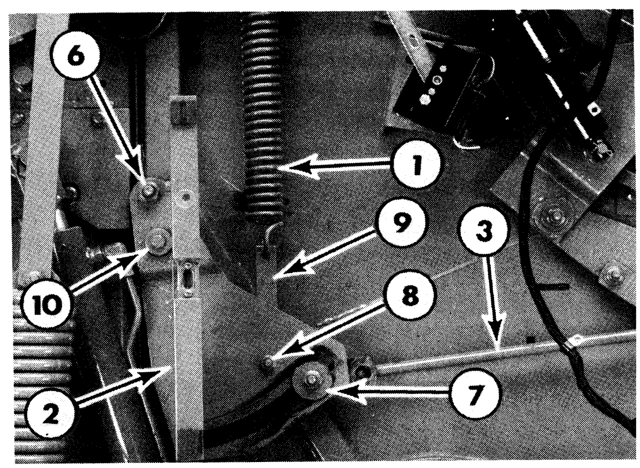


Figure 13-55

A4640-1

Assembly

Attach the bearing, 6, to the pivot plate using a hardened washer and 5/8″ UNF nut. Do not tighten the nut until the bearing is adjusted after the knife latch rod, 3, is installed.

Attach the pivot plate, 2, to the frame using a 1-3/8″ OD washer and M10 x 30 cap screw at 10.

Open the tailgate and engage the lockout.

Attach the spring, 1, to the frame and strap, 9.

Attach the spring strap, 9, to the plate using an M10 x 30 cap screw, 7/16″ (11.1 mm) long spacer, and flanged nut at 8.

Close the tailgate.

Attach a 13/32″ (10.3 mm) long spacer to the rear of the latch rod, 3, using an M12 x 40 cap screw, 2″ (50 mm) OD washer, washer and flanged nut at 7.

The mounting stud on bearing, 6, includes an eccentric that can be used to adjust the bearing location so that with the tailgate closed the spacer at 7 is not against the front of the slot in the pivot plate.

KNIFE AND KNIFE SUPPORT

The knife and knife guide are attached to the rear of the knife mount. The knife is made in three segments (Models 644 and 654) or four segments (Model 664).

A shaft in the pivot bracket attached to each end of the knife mount pivots in a bearing in the plates at each end of the support.

The knife assembly must drop freely so it cuts the net properly. If the knife does not drop freely, the net may be torn ragged instead of being cut.

Model 644

Disassembly

Remove the latch spacer, 1, from the knife support.

Remove the cotter pins from the shafts in the pivot shaft bracket, 2, and support plate, 3, and remove the washers and spacers from the shafts.

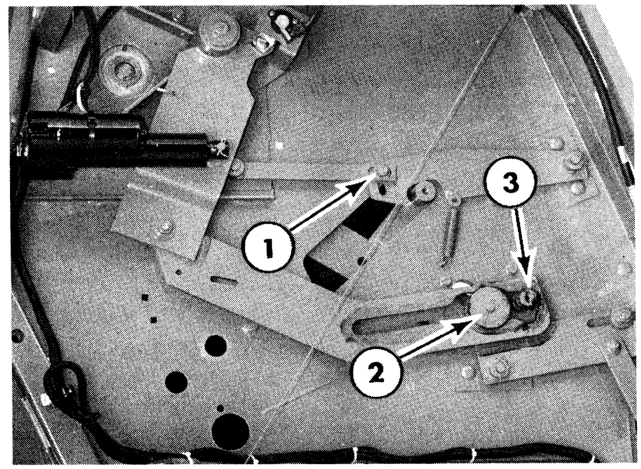


Figure 13-56

A4104-14

Remove the cap screw securing the knife support to the spacer, 4, attached to the reset link.

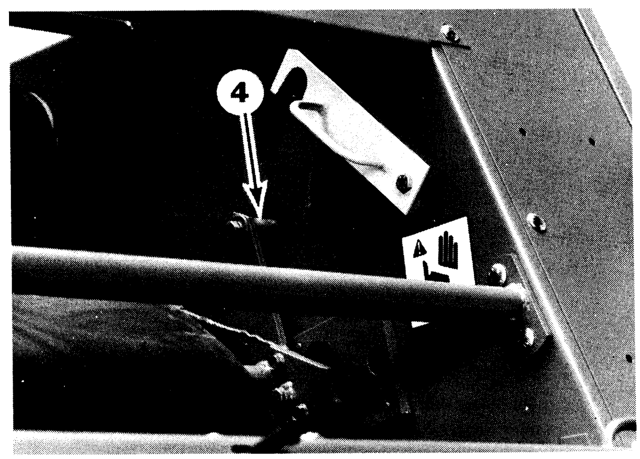


Figure 13-57

1630-9

Remove the rubber flap, 5, from the knife mount or fold it out of the way.

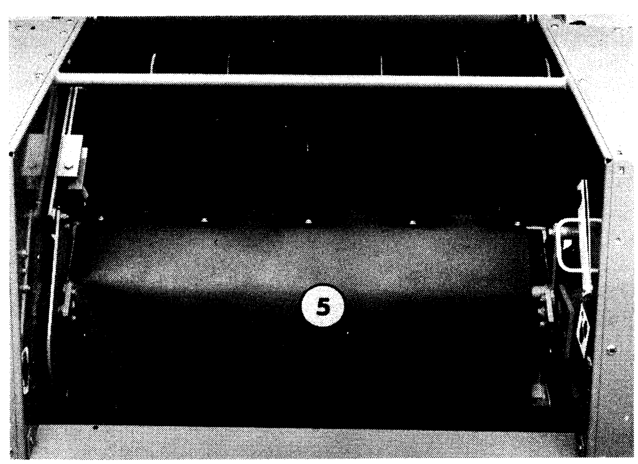


Figure 13-58

1635-8

Remove the cap screws attaching the pivot brackets, 2, to the knife mount.

Remove the pivot brackets from the knife mount and bearings in the support plates, 3, by using a soft punch to drive the pivot shafts toward the center of the baler. This will allow the knife and mount to be removed from the baler.

The knife sections and guide can be removed from the support by removing the carriage bolts, lock washers, and nuts at 6.

The support plates, 3, can be removed by removing four cap screws from each plate. The bearings can then be removed from the plates.

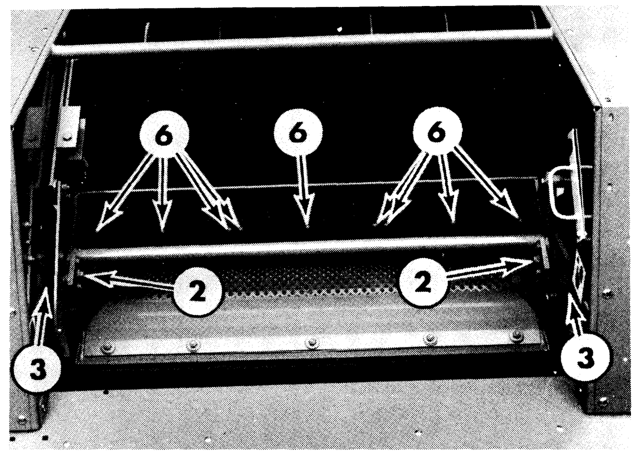


Figure 13-59

1635-7

Assembly

Install the knife sections and guide on the support using M6 x 20 carriage bolts, lock washers, and nuts at 6. The guide should be above the knife sections. The bevel edge of the knife sections should be facing away from the guide.

Install the bearings in the support plates.

Attach the support plates, 3, to the baler using eight M8 x 16 self-locking cap screws.

Place the knife and mount assembly in the baler.

Assemble the pivot shaft brackets, 2, through the knife mount and the bearings in the support plates, 3. Attach the pivot shaft brackets to the knife support using four M10 x 20 self-locking cap screws.

Place a 13/32″ (10.3 mm) long spacer, 2-1/2″ OD washer, 1/2″ (12.7 mm) long spacer, and 2-1/2″ OD washer on the pivot shaft bracket shaft, 2, in the order listed and install a 1/8″ x 1-1/4″ cotter pin.

Place a 1/2″ (12.7 mm) long spacer and a 3/4″(19 mm) long spacer on the support bracket shaft, 3, Figure 13-56, and install a 1/8″ x 1-1/4″ cotter pin.

Attach the latch spacer, 1, to the knife support using an M12 x 30 cap screw, washer, and lock washer.

Attach the knife support to the reset link spacer, 4, Figure 13-57, using an M12 x 30 cap screw, washer, and lock washer.

Attach the rubber flap, 5, Figure 13-58, to the knife support using M8 x 20 cap screws and lock washers.

Models 654 and 664

Disassembly

Remove cap screw, 1, and the spacers between the latch rod and knife mount.

Remove the cotter pin from the shaft in the pivot bracket, 2, and remove the spring bracket, 3; brake arm, 4; washers; and spacers from the shaft.

Remove the cotter pin from the shaft in the right support plate, 5, and remove the washers and spacers.

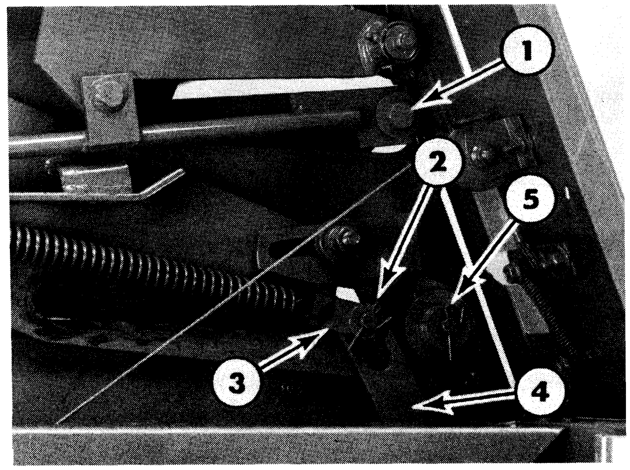


Figure 13-60

A4640-7

Remove the rubber flap, 6, from the knife mount or fold it out of the way.

Remove the cap screws attaching the pivot brackets, 2, Figures 13-61 and 13-62, to the knife mount.

Remove the pivot brackets from the knife mount and bearings in the support plates, 5, by using a soft punch to drive the pivot shafts toward the center of the baler. This will allow the knife and mount to be removed from the baler.

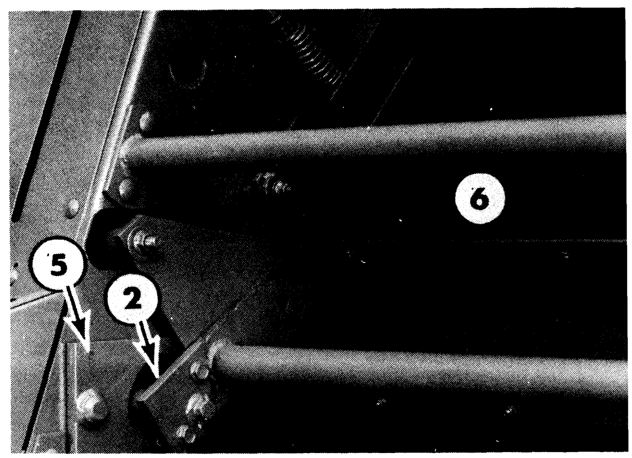


Figure 13-61

2761-10

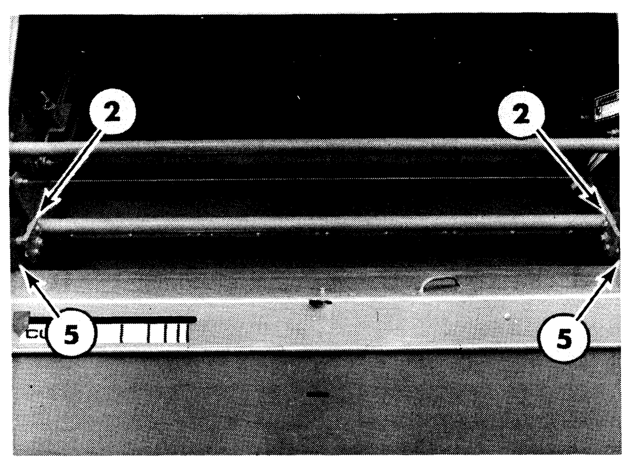


Figure 13-62

2761-11

The knife sections and guide can be removed from the mount by removing the carriage bolts, lock washers, and nuts at 7.

The support plates, 5, can be removed by removing four cap screws from each plate. The bearings can then be removed from the plates.

Assembly

Install the knife sections and guide on the support using M6 x 20 carriage bolts, lock washers, and nuts at 7. The guide should be above the knife sections. The bevel edge of the knife sections should be facing away from the guide.

Install the bearings in the support plates.

Attach the support plates, 5, Figures 13-61 and 13-62, to the baler using eight M8 x 16 self-locking cap screws.

Place the knife and mount assembly in the baler.

Install the shafts on the pivot brackets, 2, through the knife mount and the bearings in the support plates, 5. Attach the pivot shaft brackets to the knife mount using four M10 x 20 self-locking cap screws.

Place a 2-1/4″ (57 mm) washer on the shaft on the knife bearing support, 5. Place the cam over the shaft and install another 2-1/4″ (57 mm) washer, 1/2″ washers as required, and a 1/8″ x 1-1/4″ cotter pin.

Place a 1/2″ washer; 3/4″ (19 mm) long spacer; 3/8″ (9.5 mm) long spacer; brake arm, 4, Figure 13-60; spring bracket, 3; and 1/2″ washers on the pivot bracket shaft, 2, in the order listed and install a 1/8″ x 1-1/4″ cotter pin.

Install the stepped spacer between the knife mount and latch bracket using an M12 x 100 cap screw, 3/8″ (9.5 mm) long spacer, two flat washers, lock washer, and nut at 1. The small diameter of the stepped spacer fits in the knife mount, and the 3/8″ spacer fits in the latch bracket.

Attach the rubber flap, 6, Figure 13-61, to the knife mount using M8 x 20 cap screws and lock washers.

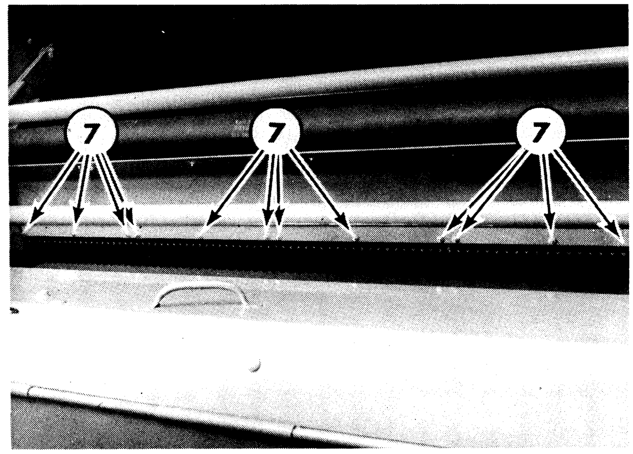


Figure 13-63

2761-9

DUCKBILL ASSEMBLY

The duckbill assembly, 1, pivots on bearings, 2, on the sledge roll support cross brace and is operated by linkage connected to the electric actuator. There is also a spreader roll, 3, mounted to the duckbill frame. Baffles on the duckbill assembly apply tension to the net so it does not come out of the duckbill during bale formation or when the duckbill moves to the rear to insert the net.

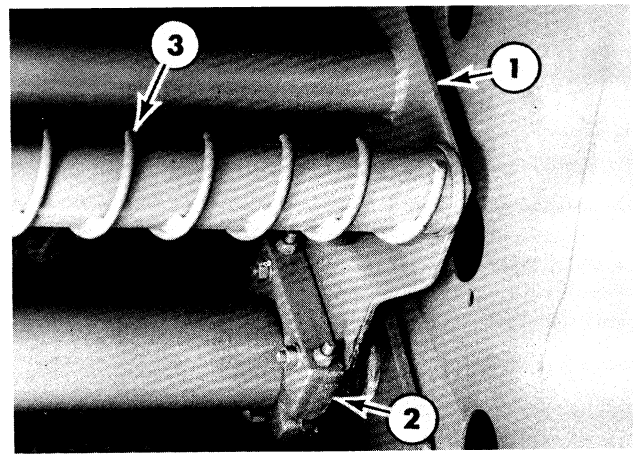


Figure 13-64

2761-6

Removal and disassembly

For Models 654 and 664 only, extend the actuator until the link attaching hardware is aligned with the hole, 4, in the side sheet.

Remove the hardware from the link, 5, Figure 13-65 (Model 654 and 664) or Figure 13-65 (Model 644), connecting the duckbill assembly to the pivot link, 6.

Remove the end caps of bearings, 2, Figure 13-64, from the cross brace on the sledge frame by removing the two socket-head cap screws securing the end cap to the bearing. Mark the end caps so they can be reinstalled on the same bearing. The bearing end caps are not interchangeable. If an end cap is damaged, the complete bearing must be replaced.

The front brace, 13, Figure 13-65, should be removed as shown in Figure 13-66 to provide additional clearance to remove the duckbill assembly.

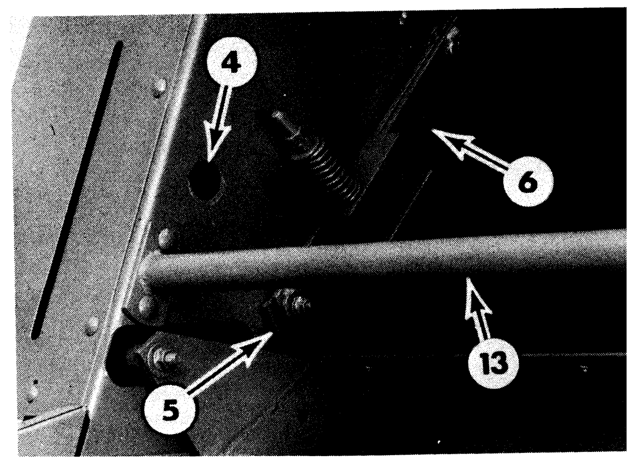


Figure 13-65

2363-9

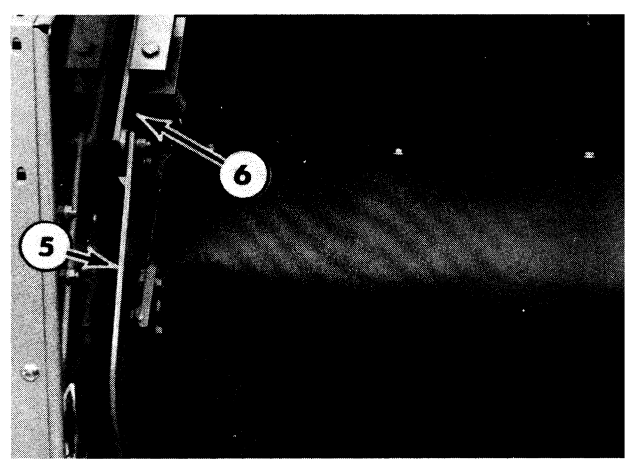


Figure 13-66

1635-8

The duckbill assembly can then be lifted out of the baler as shown in Figure 13-67 (Model 644 shown). The other part of the bearings, 2, can be removed from the duckbill by removing the carriage bolts.

Remove the upper baffle, 7, and lower baffle, 8, along with any plastic spacers and/or rubber shields, from the duckbill by removing the nuts and washers over the rubber grommets in the baffles. Remove the grommets from the baffles.

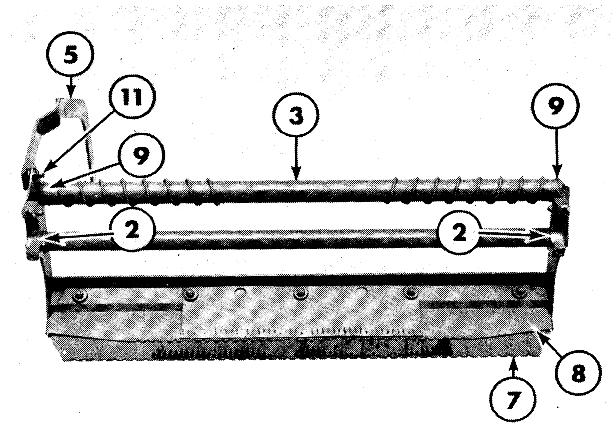


Figure 13-67

1636-5

Remove the spreader roll, 3, and shields, 9, from the duckbill by removing the socket-head screw, 10, from each end of the roll. Remove the roll support and bearing from each end of the roll. The bearing housing can also be removed if it is to be replaced.

Remove the link, 5, Figure 13-67, from the duckbill by removing the flat-head screw, spacer, flat washer, lock washer and locknut at 11.

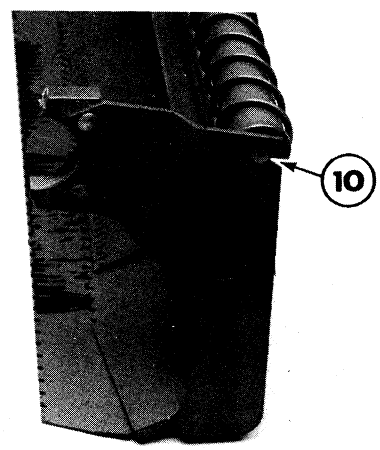


Figure 13-68

1636-10

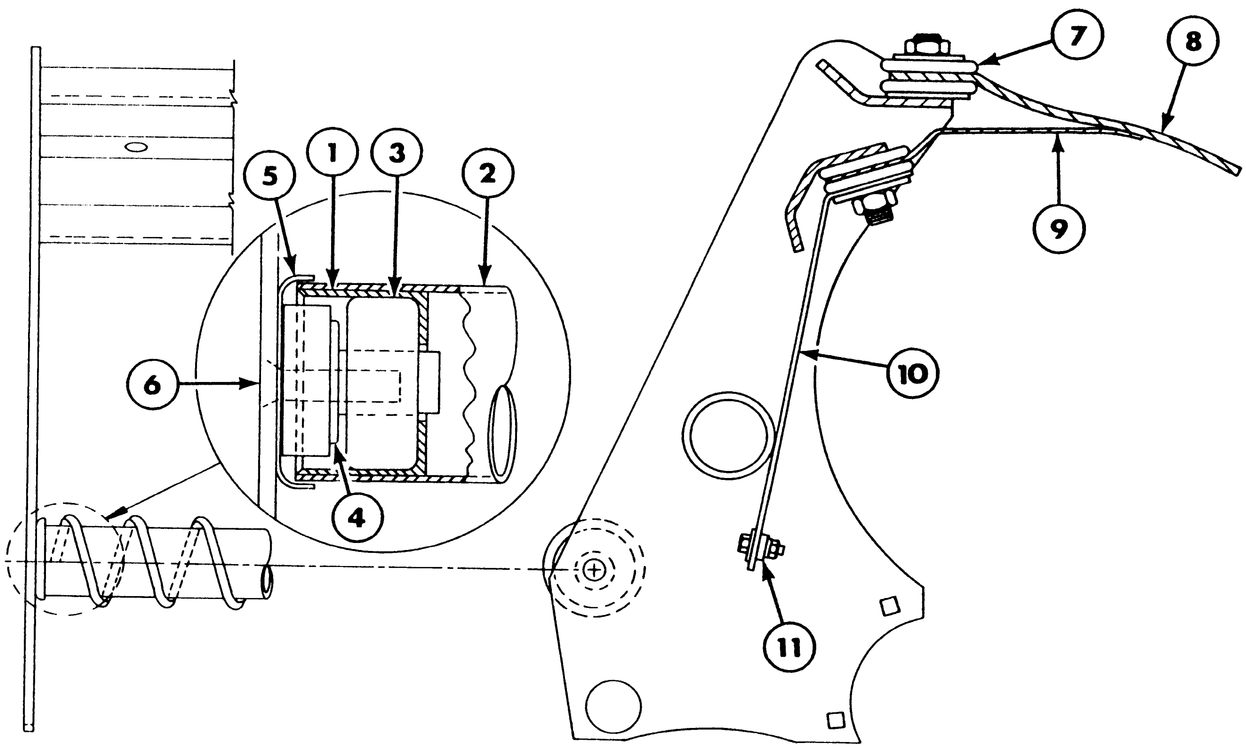


Figure 13-69

Assembly and Installation

Install a bearing housing, 1, in each end of the spreader roll, 2. The housings should be flush with the end of the roll.

Install the bearings, 3, in the housings in the roll.

Place a roll support, 4, in each bearing.

Place a shield, 5, over each end of the roll and support.

Place the roll assembly in the duckbill frame and install a 3/8″ x 1-1/2″ flat-head screw, 6, in each end. The roll should be installed so that the spiral flighting moves the net to the outside when the roll is rotated counterclockwise when looking from the left end.

Install the grommets, 7, in the holes in both the upper, 8, and lower, 9, baffles.

Place the lower baffle, 9, over the mounting bolts. Place the rubber shield, 10, over the mounting bolts and install 1-1/4″ (32 mm) OD washers and M10 locknuts. Tighten the locknuts until there are two or three threads visible. Attach the rubber shield to brackets at 11.

Place the upper baffle, 8, over the mounting bolts and install 1-1/4″ (32 mm) OD washers and M10 locknuts. Tighten the locknuts until there is one thread visible.

Attach the link, 5, Figure 13-67, to the duckbill using a 3/8″ x 1-3/4″ flat-head screw, spacer, flat washer, lock washer and locknut at 11.

Attach the bearing halves, 2, Figure 13-67, to the duckbill using four M8 x 40 carriage bolts, lock washers, and nuts.

Place the duckbill assembly in the baler.

Install the end caps on the bearings, 2, Figure 13-64, using four 5/16″ x 3″ socket-head cap screws and locknuts. Bearing end caps are not interchangeable. Be sure to use the end cap that matches the bearing attached to the duckbill.

For the Model 644, attach the link, 5, Figure 13-66, to the pivot link, 6, using an M10 x 40 cap screw, spacer, washer, lock washer, and nut.

For the Models 654 and 664, attach the link, 5, Figure 13-65, to the pivot link, 6, using a 3/8″ x 1-3/4″ flat-head screw, spacer, washer, lock washer, and locknut.

DUCKBILL OPERATING PIVOT LINKAGE

The duckbill movement is controlled by the pivot linkage that connects the actuator on the outside of the bale chamber to the duckbill on the inside.

Model 644

Disassembly

Remove the cotter pins securing the actuator, 1, to the outer link and frame. Slide the actuator off the mounting pins. The actuator can be placed on the mounting pin on the frame to support it or removed completely by disconnecting the wire harness.

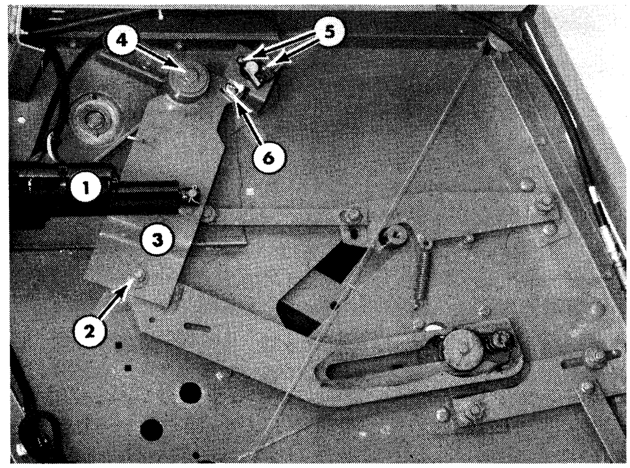


Figure 13-70

A4101-14

Remove the cap screw, 2, and spacer connecting the outer pivot link, 3, to the cam.

Remove the cap screw, 4, washer and lock washer attaching the outer pivot link to the pivot shaft.

Remove the attaching hardware, 5, from the net actuator sensor. Disengage the pivot pin, 6, from the pivot link.

Pull the outer pivot link off the shaft.

Remove the spring, 1, from the pawl, 2, on the rear of the pivot link. Remove the pawl assembly from the link by removing the cotter pin. Remove the spacer, and pin, 3, from the pawl.

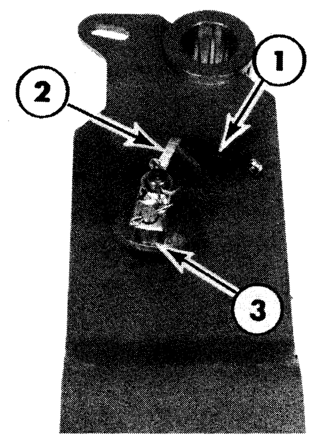


Figure 13-71

A4800-4

Remove the knife latch operating link, 1, from the pivot plate.

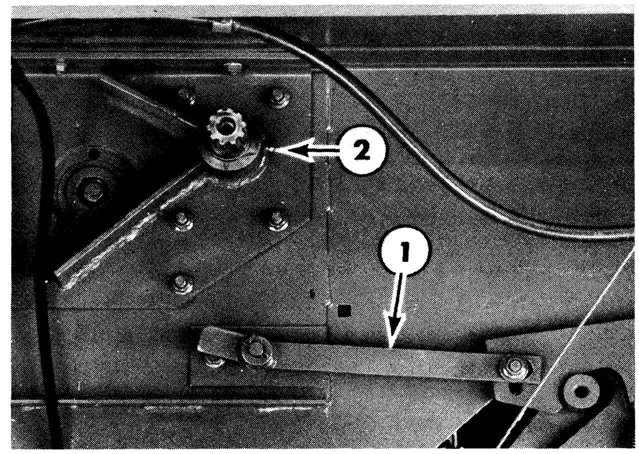


Figure 13-72

2758-3

Remove the cap screw, 5, and spacer connecting the inner link, 6, to the duckbill link, 7.

Remove the shaft and inner pivot link, 8, and the inner link, 6, as an assembly from the pivot hub.

Remove the cap screw and springs, 9, connecting the inner link and the pivot shaft link. Remove the inner link and washers from the pivot shaft.

Remove the pivot hub, 2, Figure 13-72.

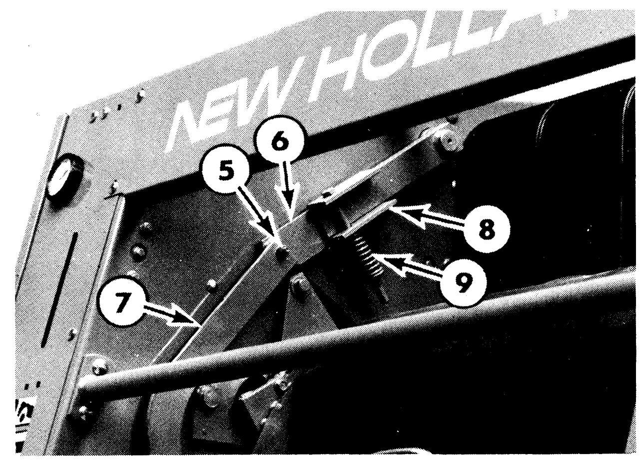


Figure 13-73

1633-10

Assembly

Install the pivot hub, 2, Figure 13-72, on the frame as shown.

Install the knife latch operating link, 1, on the pivot plate and install a washer and cotter pin.

Attach the operating link to the latch using an M10 x 30 carriage bolt, spacer, washer and locknut. Refer to the knife latch section to adjust the latch after the pivot linkage is assembled.

Coat the shaft on the inner pivot link, 8, Figure 13-73, and three 0.030″ (0.8 mm) thick washers with an antiseize-type grease.

Place two 0.030″ (0.8 mm) thick washers on the pivot shaft and then place the inner link, 6, on the shaft. Install another 0.030″ (0.8 mm) thick washer on the shaft and install the shaft assembly in the pivot hub.

Place the small diameter spring inside the large diameter spring, 9, and install the springs using a 1/2" x 7-1/2" cap screw, washer, and two jam nuts. Do not tighten the jam nuts until the assembly is completed and the actuator connected.

Install a spacer in the pawl, 2, Figure 13-71, using a clevis pin, 3, and 1/8" x 3/4" cotter pin.

Install the pawl assembly on the pivot link using a washer and 1/8" x 1-1/4" cotter pin.

Install the spring, 1, between the pawl and hub.

Place the outer link assembly, 3, Figure 13-74, on the pivot shaft. Be sure the timing marks, 10, on the link and shaft, 8, are aligned.

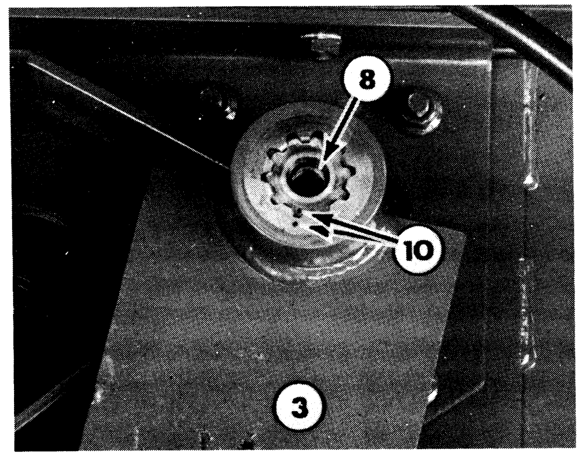


Figure 13-74

2758-4

Model 640 shown.

Install the pivot pin assembly, 6, Figure 13-70, into the slot of the outer link. Reposition the net actuator sensor and secure with two M4 x 20 cap screws, 5, through the sensor into the pivot pin disc.

NOTE: See Section 14 for net sensor calibration.

Install the M12 x 50 cap screw, 4, Figure 13-70, lock washer, and 2" (51 mm) OD washer to attach the outer link to the pivot shaft.

Install the spacer, two washers, lock washer, nut and M12 x 40 cap screw, 2, Figure 13-70, to attach the outer link to the cam.

Install the actuator, 1, on the mounting pins and secure with two 1/8" x 1-1/4" cotter pins. If the wire harness was disconnected, reconnect the actuator wire to the harness.

Adjust the jam nuts on the cap screw securing springs, 9, Figure 13-73, to obtain a spring length of 2-3/4" (70 mm).

Adjust the knife latch. Refer to the knife latch section.

Models 654 and 664

Disassembly

Remove the cotter pins securing the actuator, 1, to the outer link and frame. Slide the actuator off the mounting pins. The actuator can be placed on the mounting pin on the frame to support it or removed completely by disconnecting the wire harness.

Remove the locknut washer at 2 and spacer connecting the outer pivot link, 3, to the cam.

Remove the cap screw, 4, washer and lock washer attaching the outer pivot link to the pivot shaft.

Remove the attaching hardware, 5, from the net actuator sensor. Disengage the pivot pin assembly, 6, from the pivot link.

Pull the outer pivot link off the shaft.

Remove the spring, 1, from the pawl, 2, on the rear of the pivot link. Remove the pawl assembly from the link by removing the cotter pin. Remove the spacer and pin, 3, from the pawl.

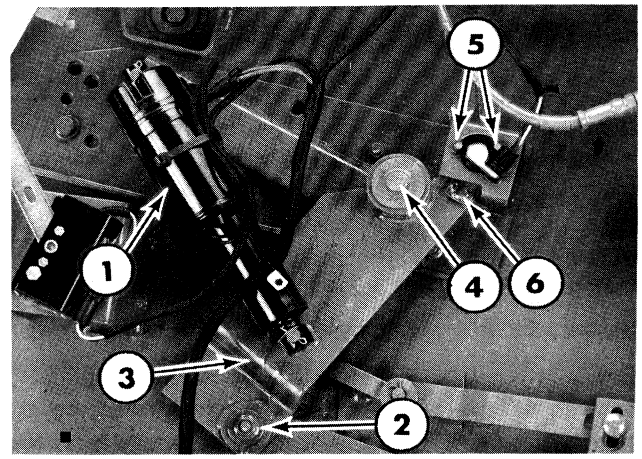


Figure 13-75

A4640-6

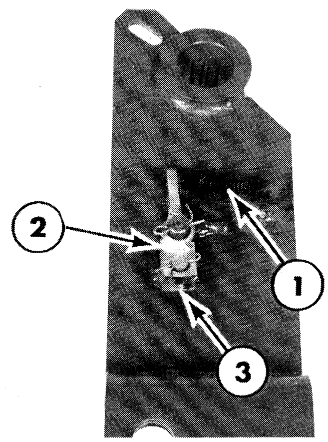


Figure 13-76

A4640-11

Remove the knife latch operating link, 1, from the pivot plate.

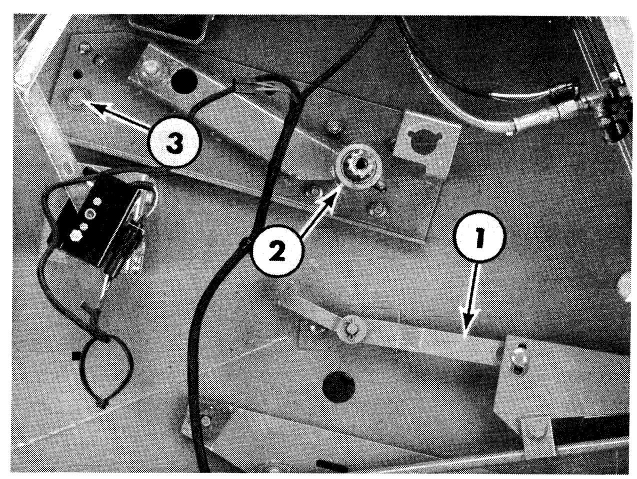


Figure 13-77

4640-12

Remove the cap screw, 7, and spacer connecting the inner link, 8, to the duckbill link, 9.

Remove the shaft and inner pivot link, 10, and the inner link, 8, as an assembly from the pivot hub.

Remove the cap screw and springs, 11, connecting the inner link and the pivot shaft link. Remove the inner link and washers from the pivot shaft.

If the pivot hub, 2, Figure 13-77, is to be removed, support the right end of the back wrap roll and remove the cap screw, 3, and washer from the end of the back wrap roll.

Remove the pivot hub, 2, Figure 13-77.

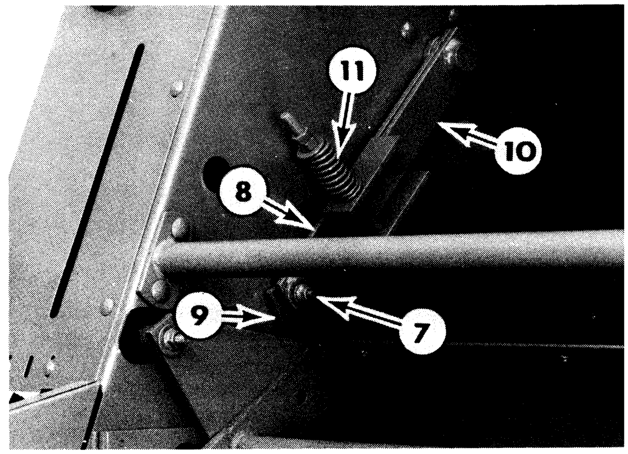


Figure 13-78

2363-9

Assembly

Install the pivot hub, 2, using four M12 x 20 cap screws and flanged nuts as shown in Figure 13-77.

Reinstall the cap screw, 3, and washers in the end of the back wrap roll using Loctite on the threads.

Coat the shaft on the inner pivot link, 10, Figures 13-78 and 13-79, and three 0.030″ (0.8 mm) thick washers with an antiseize-type grease.

Place two 0.030″ (0.8 mm) thick washers on the pivot shaft and then place the inner link, 8, on the shaft. Install another 0.030″ (0.8 mm) thick washer on the shaft and install the shaft assembly in the pivot hub.

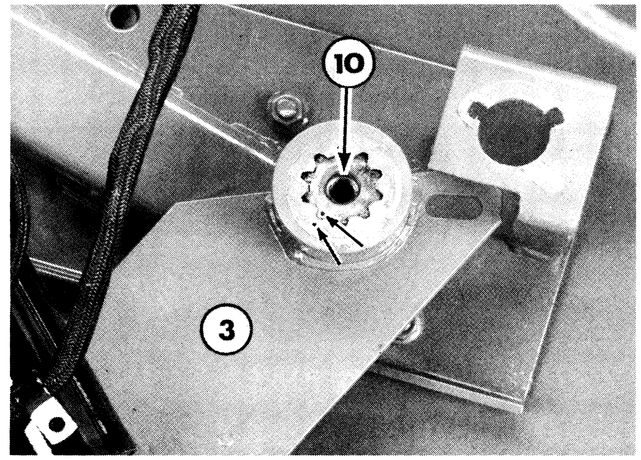
Place the small diameter spring inside the large diameter spring, 11, and install the springs using a 1/2″ x 7-1/2″ cap screw, washer, and two jam nuts. Do not tighten the jam nuts until the assembly is completed and the actuator connected.

Place the outer link assembly, 3, Figure 13-79, on the pivot shaft. Be sure the timing marks on the link and shaft are aligned.

Install the pivot pin assembly, 6, into the slot of the outer link. Reposition the net actuator sensor and secure with M4 x 20 cap screws, 5, through the sensor into the pivot pin disc.

NOTE: See Section 14 for net sensor calibration.

Use a stepped spacer, washer, M6 x 50 carriage bolt, 2, and locknut to attach the outer link, 3, to the cam. Install the stepped spacer through the outer link with the small diameter facing the baler. Place a 0.030″ (0.8 mm) washer over the spacer and between the spacer and cam.



A4640-5

Figure 13-79

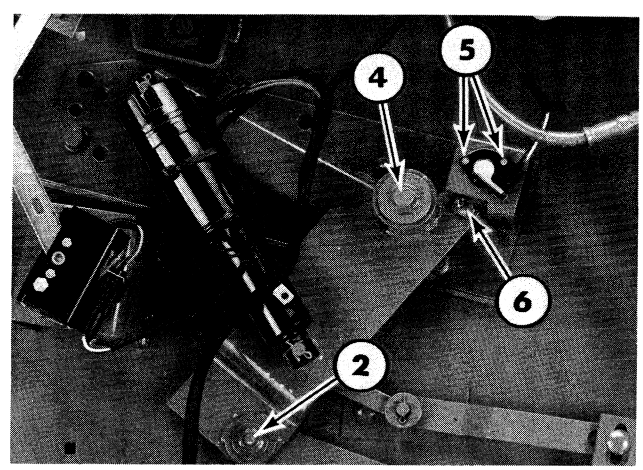


Figure 13-80

4640-6

Install the M12 x 50 cap screw, 4, lock washer, and 2″ (51 mm) OD washer to attach the outer link to the pivot shaft.

Install the actuator on the mounting pins and secure with two 1/8″ x 1-1/4″ cotter pins. Reconnect the actuator wire to the harness connector.

Use the jam nuts on the cap screw securing springs, 11, Figure 13-78, to obtain a spring length of 2-3/4″ (70 mm).

Use the EXTEND and RETRACT keys to move the actuator. The knife should be released just before the actuator reaches the home position.

CAM PLATE

Model 644

Disassembly

Remove the cotter pin and washers from the shaft on the knife pivot bracket, 1.

Remove the cap screw, 2, and spacer connecting the outer pivot link, 3, to the cam plate, 4, and remove the cam plate.

The spacers, 5, on the shaft in the knife bearing bracket do not have to be removed to replace the cam plate.

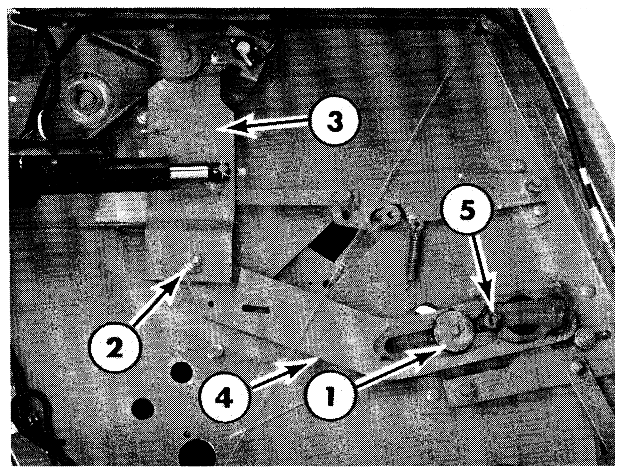


Figure 13-8

A4101-15

Assembly

Use a 0.406″ (10.3 mm) long spacer, two washers, lock washer, nut and M12 x 40 cap screw, 2, to attach the outer link, 3, to the cam plate, 4.

Install a 0.406″ (10.3 mm) long spacer, a 2-1/2″ OD washer, and 1/2″ long spacer on the shaft on the knife pivot bracket, 1. Place the cam plate over the spacer and install another 2-1/2″ OD washer and 1/8″ x 1-1/4″ cotter pin.

If the spacers, 5, were removed from the shaft in the knife bearing bracket, install a 1/2″ (12.7 mm) long and a 3/4″(19 mm) long spacer and secure with a 1/8″ x 1-1/4″ cotter pin.

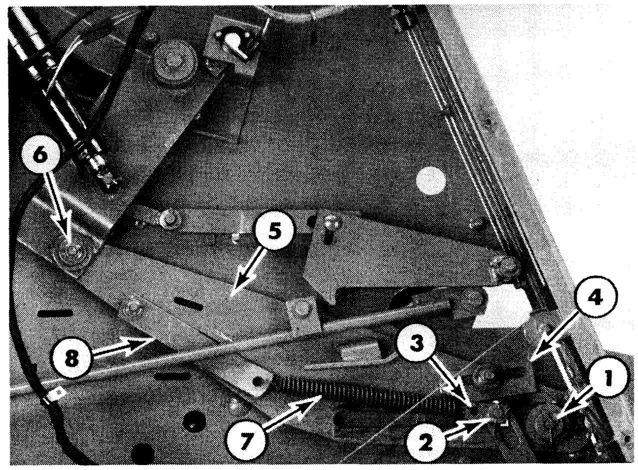


Figure 13-82

A4642-14

Models 654 and 664

Disassembly

Remove the cotter pin and washers from the shaft, 1, on the knife bearing support.

Remove the cotter pin and washers at 2, securing the spring bracket, 3, and link, 4, to the shaft on the knife pivot bracket. It is not necessary to remove the spacers from the shaft.

Remove the spring bracket and link.

Remove the cap screw, spacer and washers attaching the cam plate, 5, to the outer pivot link, 6, and remove the cam plate.

Remove the spring, 7, and spring bracket, 8, from the cam plate.

Assembly

Attach spring bracket, 8, to the cam plate, 5, using an M10 x 40 cap screw, 5/16″ (8 mm) long spacer, washer, and flanged nut.

Install a stepped spacer through the outer pivot link, 6, with the small diameter facing the baler. Place a 0.030″ (0.8 mm) washer over the spacer and between the spacer and cam plate, 5. Use an M6 x 50 cap screw, two washers, and locknut to attach the outer link to the cam plate.

Place a 2-1/4″ (57 mm) washer on the shaft on the knife bearing support. Place the cam over the shaft and install another 2-1/4″ (57 mm) washer, 1/2″ washers as required, and a 1/8″ x 1-1/4″ cotter pin at 1.

Place a 1/2″ washer; 3/4″ (19 mm) long spacer; 3/8″ (9.5 mm) long spacer; brake link, 4; spring bracket, 3; and 1/2″ washers on the pivot bracket shaft, 1, in the order listed and install a 1/8″ x 1-1/4″ cotter pin at 2.

Install spring, 7, between the spring brackets, 8 and 3.

NET BRAKE AND COUNTER ROLL

When the actuator extends to insert the net, the cam plate contacts the roller on the brake operating link and lifts the brake away from the roll of net. As the actuator moves to the precut position, the roller is released and the brake contacts the roll of net.

BRAKE OPERATING LINK AND BEARING

Model 644

Disassembly

Remove the nut and washer from the carriage bolt to remove the bearing, 1, from the pivot plate, 2.

Remove the cap screw, 3, and spacer attaching the operating link, 4, to the pivot plate.

Remove the cotter pin and washer from the end of pivot shaft, 5, to remove the plate. Remove the cotter pin and washer at 6 to move the cam plate, 7, for clearance with the plate.

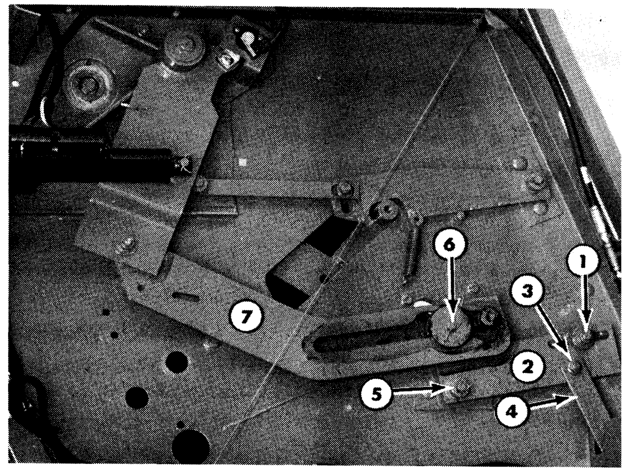


Figure 13-83

A4101-14

Remove the carriage bolt and spacer at 8, to remove the lower end of the link from the brake shaft and pad assembly.

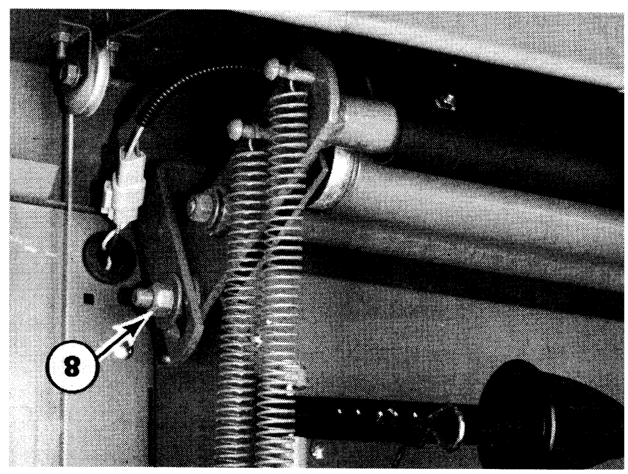


Figure 13-84

A4640-9

Assembly

Attach the lower end on the link to the brake shaft and pad assembly using a 13/32″(10.3 mm) long spacer, M12 x 40 carriage bolt, lock washer, and nut at 8.

Install the pivot plate, 2, Figure 13-83, on the pivot shaft and secure using a cotter pin and washer.

Reinstall the washer and cotter pin at 6 to secure the cam plate, 7.

Attach the upper end of the operating link, 4, to the pivot plate using a spacer, M10 x 30 cap screw, washer, and flanged nut.

Install the bearing, 1, on the pivot plate using a flat washer on each side of the bearing, a 1/2″ x 1-1/2″ cap screw, lock washer, and nut.

Locate the bearing in the middle of the slot.

Models 654 and 664

Disassembly

Remove the cotter pin and washers from the end of the shaft on the knife pivot bracket, 1, securing the spring bracket, 2, and link, 3. Do not remove the spacers from the shaft.

Remove the spring bracket and link.

Remove the bearing, 4, from the link.

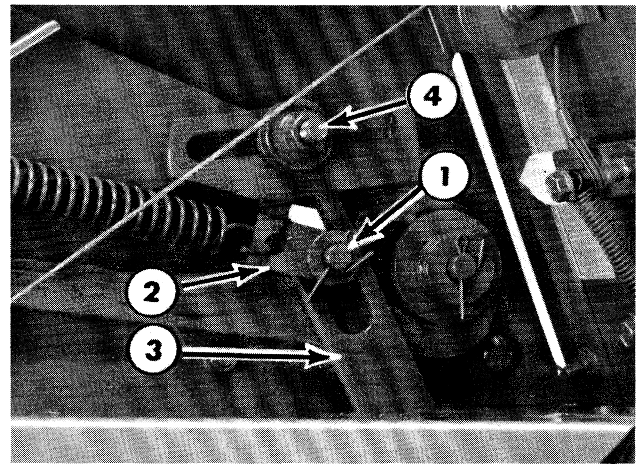


Figure 13-85

4640-7

Remove the nut and spacer from the carriage bolt at 5, to remove the lower end of the link from the brake shaft and pad assembly.

Assembly

Attach the lower end of the link to the brake shaft and pad assembly using a 3/8″ (9.5 mm) long spacer, M12 x 40 carriage bolt, lock washer, and nut at 5.

Install the bearing, 4, Figure 13-85, on the link, 3, using an M12 x 40 carriage bolt, washer, lock washer, and nut. Use a washer between the roller and link.

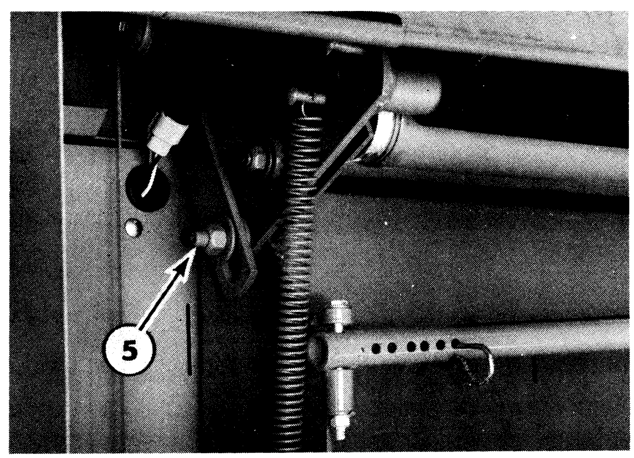


Figure 13-86

2761-7

Place the link and then spring bracket, 2, over the shaft on the knife pivot bracket, 1. Install 1/2″ washers and a 1/8″ x 1-1/4″ cotter pin in the end of the shaft.

Locate the bearing in the middle of the slot.

NOTE: Fine tuning the location of the bearing will vary depending on the type of net used.

COUNTER ROLL AND BRAKE

Disassembly

Remove the nut and spacer from the carriage bolt at 1, to remove the lower end of the link from the brake assembly, 2.

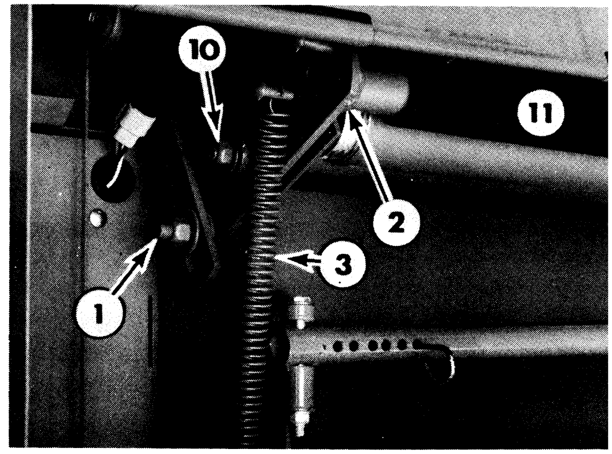


Figure 13-8

2761-7

Remove the springs, 3, Figures 13-87 and 13-88, from the pin on each end of the brake assembly, 2.

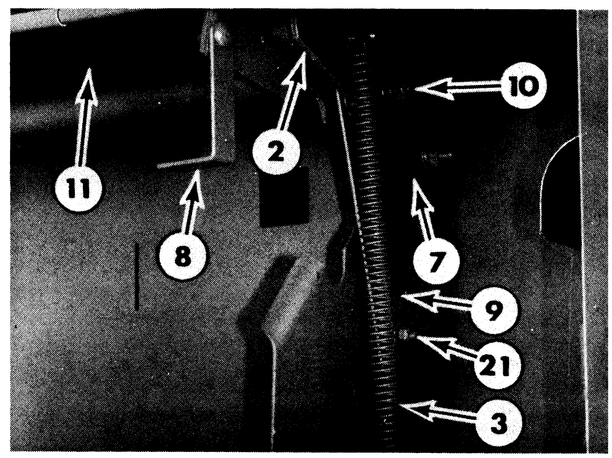


Figure 13-8

2761-12

Remove the counter roll, 5, Figures 13-89 and 13-90; support, 4; and brake shaft assembly 2, from the baler by removing the spacer and hardware at 6, at each end. The lift arm, 7, Figures 13-88 and 13-90, will also be removed when the left end hardware is removed.

Remove the handle, 8, and lock, 9, from the lift arm.

Remove the lock from the support.

Remove the carriage bolts and spacers, 10, Figures 13-87 and 13-88, from both sides of the brake shaft and remove the shaft and pad assembly.

Remove the cap screws securing the pad, 11, to the shaft.

Remove the counter roll, 5, Figures 13-89 and 13-90, by removing the shaft and plate, 12, at each end of the roll. There is a spacer, 13, Figure 13-91, at the sensor end of the roll and washer(s), 14, at the opposite end.

Separate the hub, 15, from the roll by heating to approximately 450° F (232° C) to soften the retaining compound. Do not overheat.

Inspect the roll bearings, 16, and replace if required.

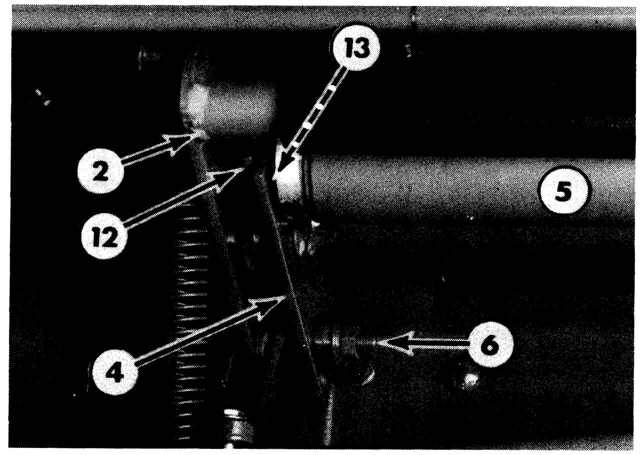


Figure 13-89

2761-8

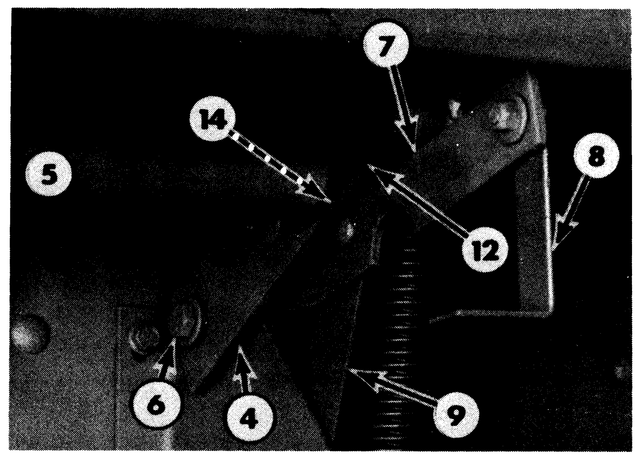


Figure 13-90

2761-5

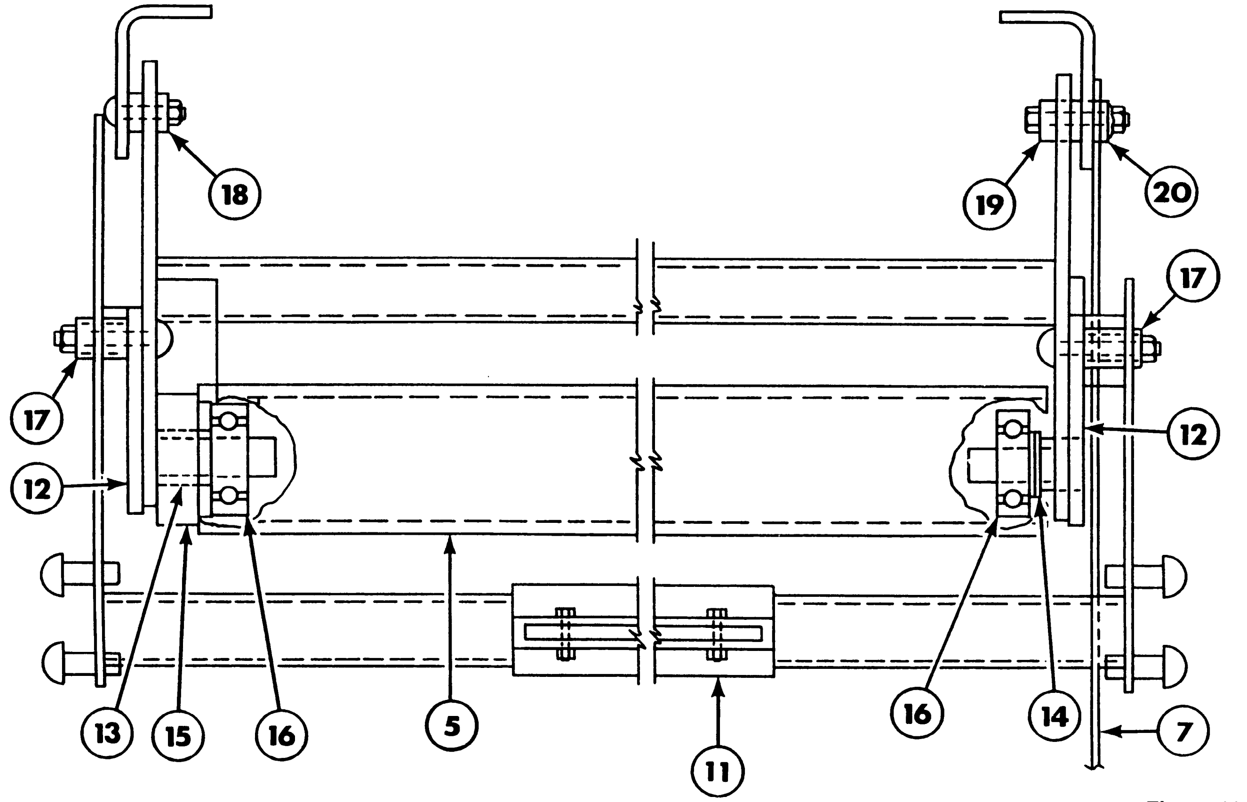


Figure 13-9

Assembly

Attach the pad, 11, to the shaft using M6 x 16 cap screws, washers, and nuts. Use a washer under both the head of the cap screw and the nut.

Clean the mating surfaces of the magnet and hub, 15, and the roll, 5. Apply a thin coat of thread-locking Loctite 242 (or equivalent) to the mating surfaces. Press the hub into the roll.

Reinstall the counter roll and magnet assembly in the support using shaft and plates, 12. Use a 31/32″ (24.6 mm) long spacer, 17, M10 x 50 carriage bolt, lock washer, and locknut to install each plate. Be sure to install spacer, 13, at the sensor end of the roll. Use washers at 14 to reduce end play of the roll to a minimum so the magnet will stay aligned with the sensor.

NOTE: If too many washers are used at 14, the roll may not spin freely and will provide an inaccurate reading to the controller which in turn will apply too much net to the bale.

Install the counter roll, brake, and support assembly and the lift arm, 7, Figure 13-88, in the baler. Use a 5/8″ (16 mm) long spacer, 18, Figure 13-91, M10 x 30 carriage bolt, lock washer an nut to attach the right end. Use a 5/8″ (16 mm long spacer, 19; a 5/16″ (8 mm) long spacer, 2(an M10 x 50 cap screw; washer; lock washer an nut to attach the left end and the lift arm, 7.

Attach the lock, 9, Figure 13-88, to the lift arı using a 1/4″ (6.4 mm) long spacer, M8 x 2 carriage bolt, lock washer, and locknut.

Install a 1/4″ (6.4 mm) long spacer, M8 x 2 carriage bolt, lock washer, and locknut throug the lock at 21.

Attach the handle, 8, to the lift arm using a 1/4 (6.4 mm) long spacer, M8 x 25 carriage bolt, loc washer, and locknut.

Attach the lower end of the operating link to th brake support using a spacer, M12 x 40 carriag bolt, lock washer, and nut at 1, Figure 13-89.

Reconnect the springs, 3, at each end to th support. Attach the springs to the rear pins using black net and front pins if using white ne

NOTE: The Models 644 and 654 have tw springs on each end of the support.

LABOR GUIDE

TWINE WRAPPER	HOURS
Actuator, R & R	0.50
Drag link,	
R & R	0.50
Adjust	0.25
Knife, R & R	0.50
Knife operating rod,	
Adjust	0.10
R & R	0.25
Knife rod spring,	
Adjust	0.10
R & R	0.20
Knife support, left, R & R	1.50
Knife support, right, R & R	1.00
Knife slide, R & R	1.50
Knife slide support, R & R	2.00
Pivoting link, actuator, R & R	1.00
Twine tube,	
R & R	0.50
Adjust	0.25
Twine tube breakaway eccentric,	
R & R	0.50
Adjust	0.25
Twine tube bullet, R & R	0.25
Twine tube holder and shaft, R & R	1.50
Twine tube gear, R & R	0.50
Twine tube breakaway,	
R & R	1.00
Adjust	0.25
Twine tube support, R & R	2.00

NET WRAPPER	HOURS
Brake operating link, R & R	0.50
Brake pad, R & R	0.50
Brake roller	
R & R	0.50
Adjust	0.25
Brake spring, R & R	0.10
Brake support, R & R	1.00
Cam, 644, R & R	1.00
Cam, 654, 664, R & R	1.25
Counter roll, R & R	1.50
Duckbill assembly, R & R	2.00
Duckbill baffle, R & R	0.50
Duckbill rubber shield, R & R	0.50
Knife and guide, R & R	1.00
Knife pivot shaft, R & R	0.50
Knife pivot support, R & R	1.00
Knife reset link, R & R	0.50
Knife reset pivot, R & R	0.75
Knife and support assembly, R & R	2.50
Latch, knife, 644,	
R & R	0.50
Adjust	0.25
Latch, knife, primary, 654, 664,	
R & R	0.50
Adjust	0.25
Latch, knife, secondary, 654, 664,	
R & R	0.25
Adjust	0.25
Pivot link, duckbill,inner, R & R	1.50
Pivot link, duckbill,outer, R & R	1.00
Spreader roll, R & R	2.50
Spreader roll bearing, R & R	2.75
Spring, duckbill override	
R & R	0.50
Adjust	0.25

INDEX

SECTION 14

BALE COMMAND PLUS ELECTRICAL SYSTEM

GENERAL INFORMATION

This section of the Models 634, 644, 654, and 664 Round Baler Service Manual covers the electrical portion of the Bale Command Plus system. Refer to Section 13 for the mechanical portion of the Bale Command Plus system.

COMPONENTS

The Bale Command Plus system includes the following components that are shown in Figures 14-1 through 14-9. The components are connected by wiring harnesses.

1 Operator's panel

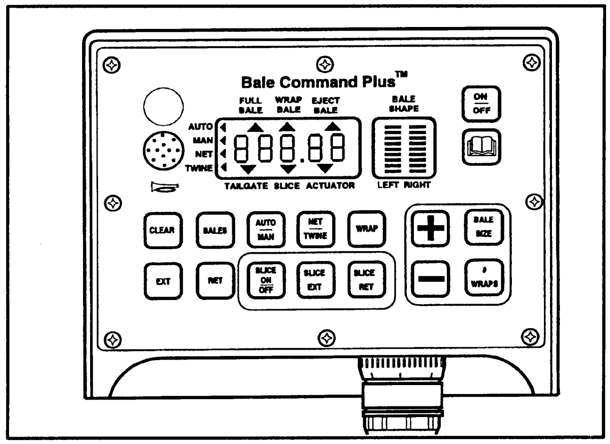


Figure 14-1

1 Wire harness connector bracket

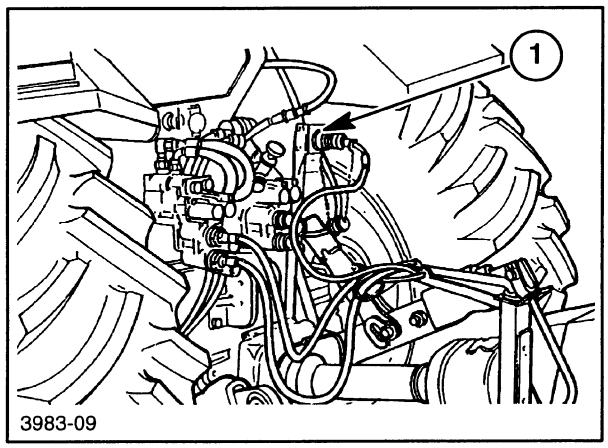


Figure 14-2

1 Controller

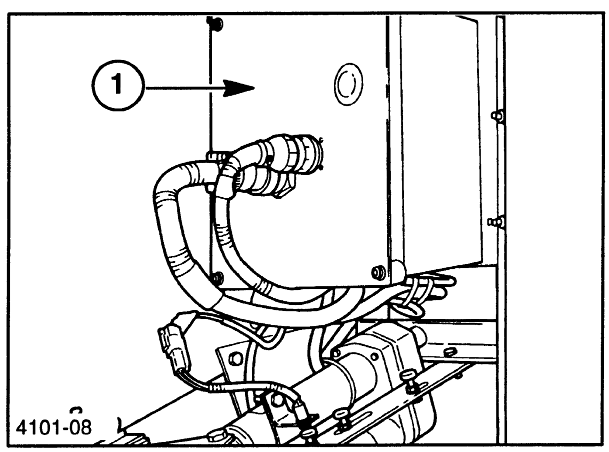


Figure 14-3

1 Bale size sensor

2 Net wrapper actuator

3 Net wrapper actuator position sensor

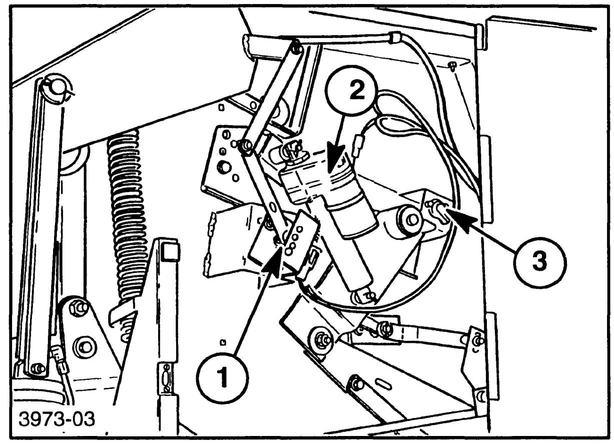


Figure 14-4

1 Twine wrapper actuator

2 Twine wrapper actuator sensor

3 Twine wrapper actuator sensor magnets

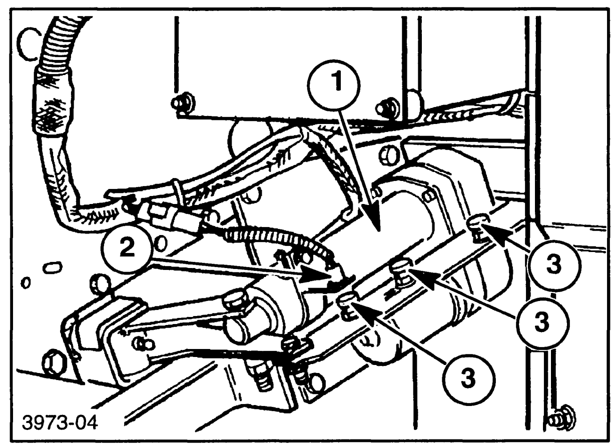


Figure 14-5

1 Tailgate sensor

2 Tailgate sensor magnet

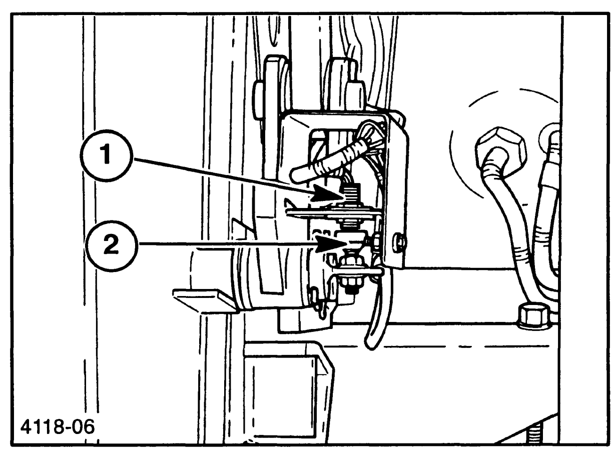


Figure 14-6

1 Counter roll sensor

2 Counter roll sensor magnet

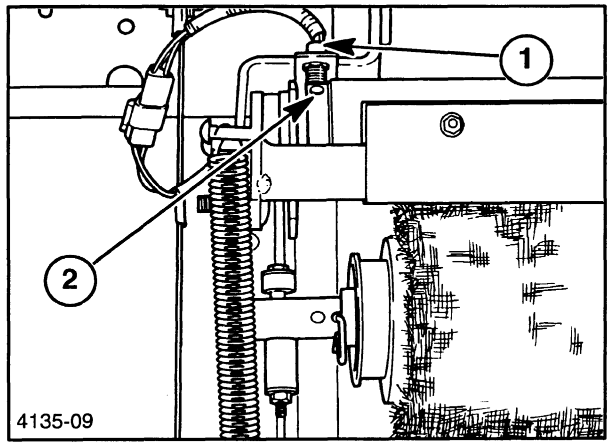


Figure 14-7

1 Bale shape sensors (right-hand only shown)

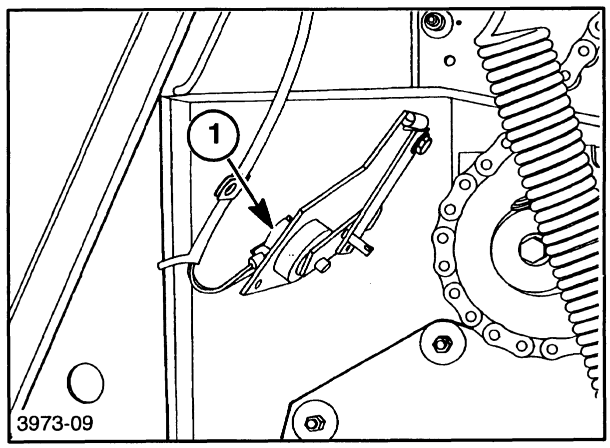


Figure 14-8

1 Bale Slice actuator

2 Bale Slice actuator position sensor

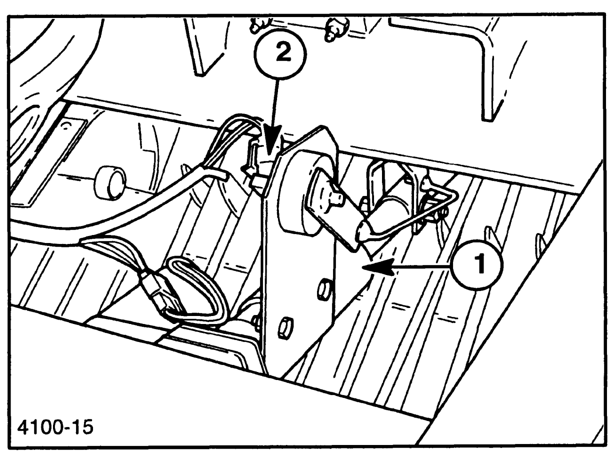


Figure 14-9

OPERATION

Bale Command Plus is a computerized control system that allows the operator to visually and audibly know when to shift the baler from one side of the windrow to the other for proper feeding of the round baler. The controller also provides the operator with the ability to select the desired number of twine or net wraps on the bale and wraps the bale automatically. The system retains the selected wrap program as long as desired but can be easily reprogrammed.

NOTE: The Bale Command Plus system is designed for use with a 12-volt, negative ground system only.

OPERATION - TWINE OR NET

As the bale size increases (after the core is formed), the linkage from the take-up arm moves the bale size sensor (a potentiometer) and changes the output signal to the controller. The controller converts the signal to the bale size and changes the display on the operator's panel.

The left and right bale density sensors also send signals to the controller which uses the signals to change the height of the respective bar graphs to provide a guide for the operator to produce a uniform bale.

When the bale reaches the programmed size, the controller will send a signal to the operator's panel to alert the operator. The full bale size will be displayed in brackets and, after a short delay, the controller will start the wrapping cycle. The operator should stop forward motion as soon as the full bale is indicated. After the wrapping cycle is completed, the controller will send a signal to the operator's panel to tell the operator to eject the bale. When the tailgate is closed after the bale is ejected, the tailgate sensor will be activated to reset the controller for the next bale and add 1 to the bale count. The operator's panel will indicate when the tailgate is latched so the operator can start forming the next bale.

TWINE WRAPPING CYCLE

When the controller alerts the operator that the full bale size has been reached, it also sends power to the twine tube actuator. When the actuator extends, the twine tubes will drop to the start position. A sensor will tell the controller that the twine tubes have dropped completely. After a programmed delay, the controller will retract the actuator by moving the twine tubes following the pattern selected. When the actuator reaches the precut sensor magnet, it will pause until the programmed amount of end wraps are placed on the bale and then return to the home position. As the actuator moves the twine tubes from the precut to the home position, the twine will be cut. When the actuator reaches the home position, the controller will send a signal to the operator's panel to tell the operator that the cycle is completed and that the bale can be ejected.

NOTE: If the cycle is interrupted, an error message will be displayed. The cycle can be interrupted if the tailgate sensor moves away from the magnet, or if the operator presses any of the following keys: AUTO/MAN, EXTend, RETract or ON/OFF.

NET WRAPPING CYCLE

When the controller alerts the operator that the full bale size has been reached, it also sends power to the net wrap actuator. The actuator will extend to insert the duckbill containing the net between the upper dimpled roll and the bale. When the bale starts to grab the net and pull net off the roll, the counter roll sensor will send signals to the controller. After the controller receives the net start signal, it will move the actuator to the precut position and count the number of revolutions of the counter roll to determine how much net is being used. When the programmed amount of net has been wrapped on the bale, the actuator will be moved to the home position and the net will be cut. When the actuator reaches the home position, the controller will send a signal to the operator's panel to tell the operator that the cycle is completed and that the bale can be ejected.

NOTE: If the cycle is interrupted, an error message will be displayed. The cycle can be interrupted if the tailgate sensor moves away from the magnet, or if the operator presses any of the following keys: AUTO/MAN, EXTend, RETract or ON/OFF.

BALE SLICE OPERATION

After the core of the bale is formed to the selected size, the controller will send a signal to extend the slice actuator and pivot the Bale Slice knives into the path of the rotating bale.

The knives will stay extended and slice the bale until the bale reaches 4″ (100 mm) less than the preset full bale size if the bale is to be wrapped with twine or until the bale reaches the preset full bale size if the bale is to be wrapped with net at which time the actuator will retract the knives before starting the wrapping cycle. The bale size at knife withdrawal can be changed to allow more uncut material if desired. Refer to the Bale Command Plus operator's manual.

ADJUSTMENTS

CAUTION: NEVER CARRY OUT ANY MAINTENANCE WORK WHILE THE MACHINE IS RUNNING. ALWAYS DISENGAGE THE TRACTOR PTO DRIVE, STOP THE TRACTOR ENGINE, AND APPLY THE BRAKES. ALWAYS REINSTALL ALL GUARDS AFTER ADJUSTING OR REPAIRING THE MACHINE.

CAUTION: WHEN WORKING ON A NET/TWINE MACHINE, THE NET KNIFE LATCH, 1, SHOULD BE ENGAGED AS SHOWN. SERIOUS INJURY COULD RESULT IF THE KNIFE DROPS UNEXPECTEDLY.

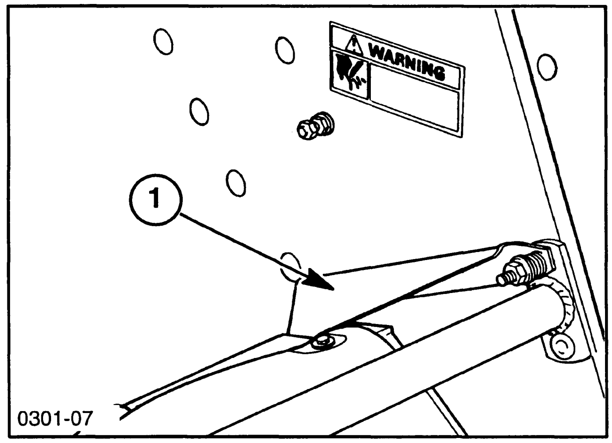


Figure 14-10

Keep electrical connections properly connected and free from rust or corrosion. The use of a dielectric grease is recommended for use on the electrical connector pins. This grease lubricates the pins reducing the possibility of corrosion and provides good electrical continuity between mating parts. This grease will collect dust and dirt if left exposed, so all connectors should be protected when they are disconnected.

For the Bale Command Plus system to operate properly, all of the sensors and magnets must be adjusted correctly.

The EXTend and RETract keys can be used to manually move an actuator.

TAILGATE SENSOR (All Models)

With the tailgate closed and latched, adjust magnet, 1, to a clearance of 1/8″ (3 mm) between the magnet and sensor, 2. The magnet should be centered under the sensor.

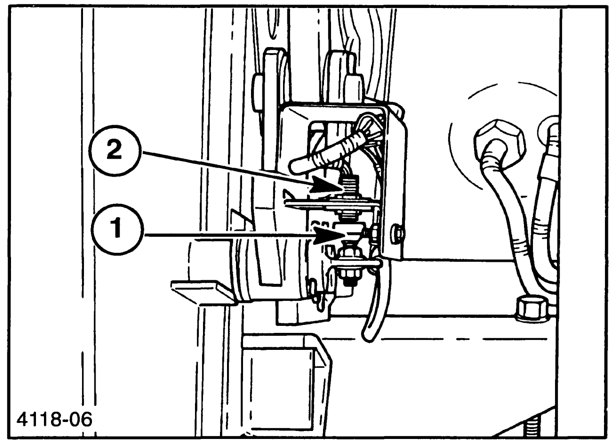


Figure 14-11

NET COUNTER ROLL SENSOR

Adjust the clearance between the counter roll sensor, 1, and the magnet, 2, in the ring on the counter roll shaft to 1/16″ (1.5 mm). The sensor should be centered over the magnet.

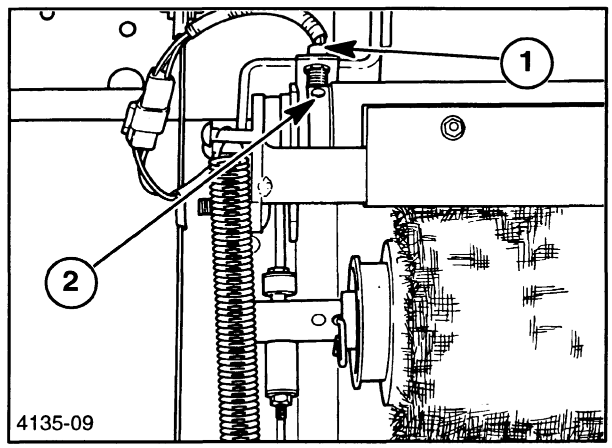


Figure 14-12

ACTUATOR SENSOR (Twine Tubes)

Retract the actuator as shown. Adjust the home position magnet, 1, to a clearance of 3/16″ (5 mm) between the home position magnet and sensor, 2. Center the magnet under the sensor.

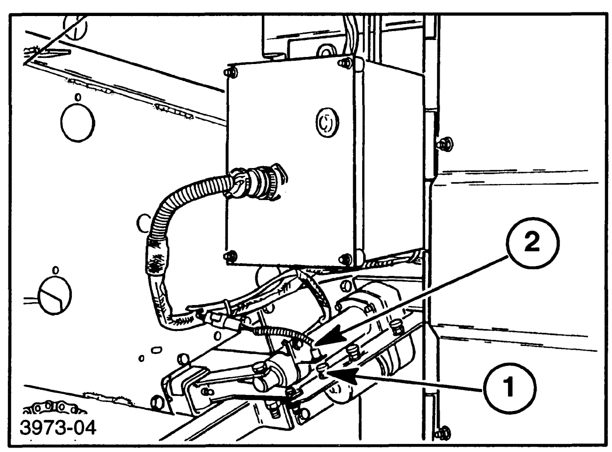


Figure 14-13

Extend the actuator until the actuator ratchets.

Adjust extended position magnet, 1, until the magnet and sensor, 2, have a clearance of 3/16″ (5 mm).

Adjust the extend magnet in the slot until it is centered under the sensor, 2. There should be 6″ (152 mm) from the center of the home position magnet, 1, to the center of the extended position magnet.

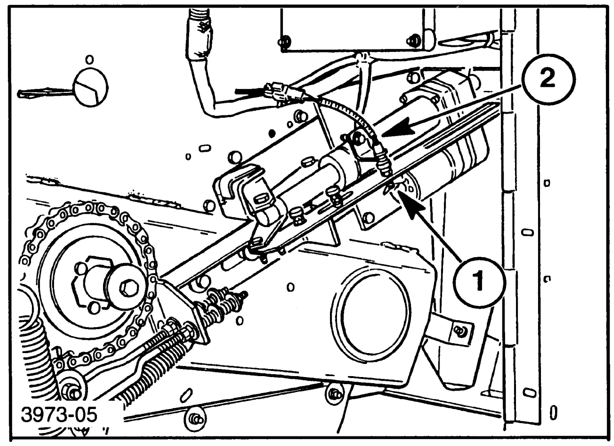


Figure 14-14

Adjust the precut magnet, 1, until it is 1-15/16″ (49 mm) from the center of the home position magnet, 2. Set the clearance between sensor, 3, and the precut magnet, 1, to 3/16″ (5 mm). In the automatic mode, the twine tubes should stop at this point to wrap the end of the bale before moving to the home position to cut the twine. If the twine tubes are not stopping at the proper location for the end wraps, adjust the position of the precut magnet.

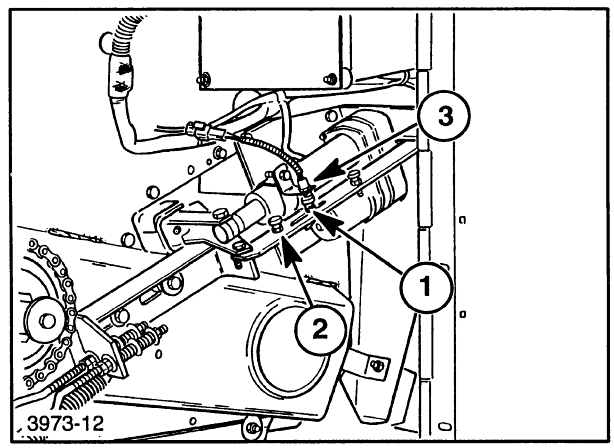


Figure 14-15

BALE SIZE SENSOR AND BRACKET (All Models)

The bale size sensor bracket, 1, adjustment may need to be checked if a problem with the bale size occurs or if the sensor cannot be calibrated.

WARNING: IF THE CONTROLLER IS IN THE AUTOMATIC MODE, THE WRAPPER ATTACHMENT WILL START MOVING WHEN THE SENSOR REACHES THE PRESET FULL BALE SIZE. THE CONTROLLER SHOULD BE PLACED IN THE MANUAL OR SETUP/DIAGNOSTIC MODE BEFORE MAKING ANY ADJUSTMENT OR TROUBLESHOOTING THE SYSTEM.

To check the adjustment, place the controller in the SETUP/DIAGNOSTIC mode by pressing and holding the OPEN BOOK KEY. Select setup/diagnostic item 11 by pressing the OPEN BOOK key repeatedly. This will display a number between 33 and 245 on the operator's panel. When the bale chamber is empty, the number should be between 33 and 50.

If the number is not between 30 and 50, loosen the mounting bolts and rotate bracket, 1, until the lowest number is displayed.

Rotate bracket, 1, until the count increases 5 to 10 greater than the minimum and tighten the bolts. The bale size sensor is now adjusted properly.

To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

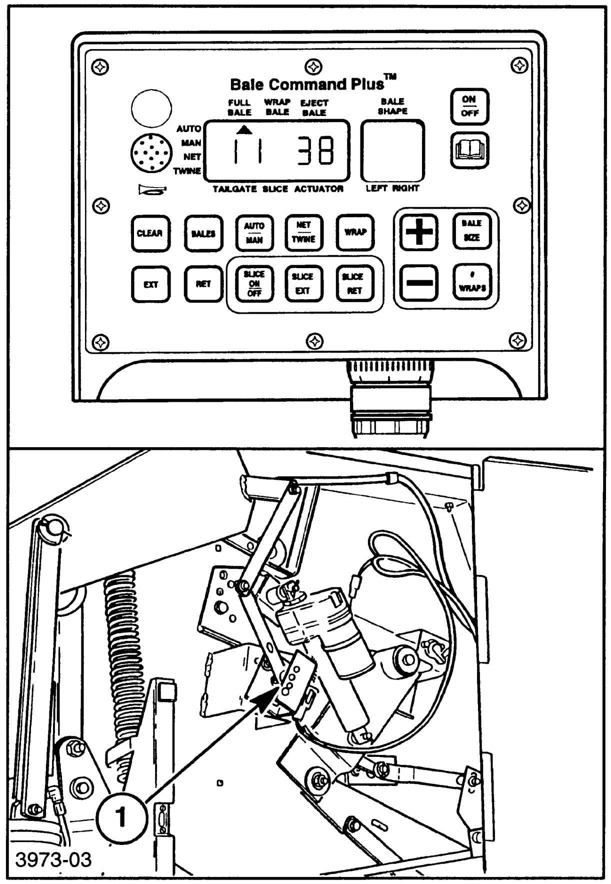


Figure 14-16

NET ACTUATOR SENSOR

Setup/diagnostic item 12 is used to adjust the net actuator position sensor mount for the home position, to calibrate the sensor home position, and to check operation of the sensor, 1.

To adjust and calibrate the sensor home position:

1. Check to be sure the actuator is fully retracted. If it is not, use the RETract key to move it to the home position.
2. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate “1” and the “full bale” size.
3. Press and release the OPEN BOOK key repeatedly to advance to item 12.

   The left of the display should read “12,” the NET indicator triangle should be ON and the ACTUATOR indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 20 and 30 when the actuator is in the home position.
4. Loosen the sensor mounting bolts and rotate the sensor. The number on the display should change as the sensor is rotated. Rotate the bracket until the number is between 20 and 30 and then tighten the sensor mounting hardware.

   The allowable range for the display is 11 to 245. If the numbers decrease at any time while moving toward the extended position or if the number goes up to 255, check the wiring harness for damage or a loose connection.

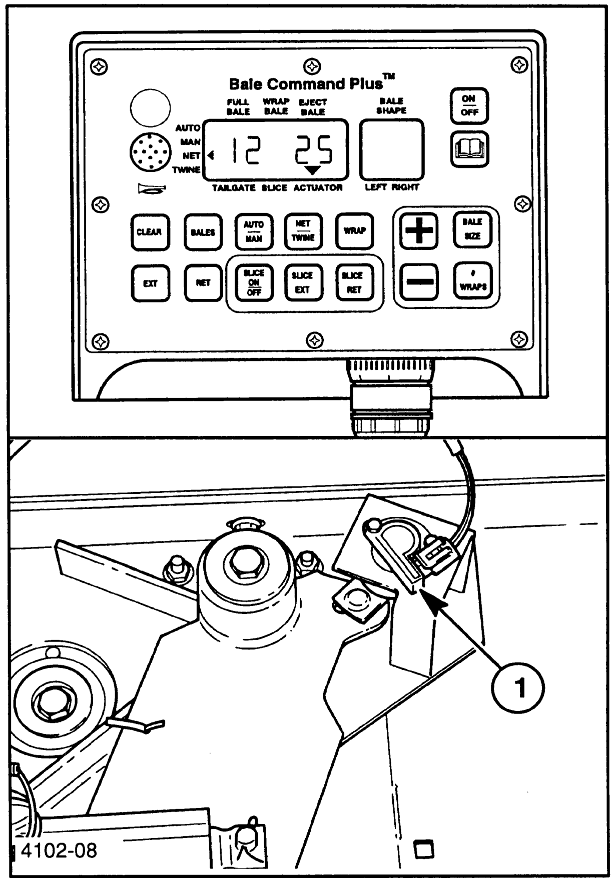


Figure 14-17

5. Calibrate the sensor by pressing and holding the minus (-) key for one second until the alarm activates. The actuator indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed, and the alarm will sound three short beeps.

   The precut position is set automatically when calibrating the "home" position.

6. To advance to setup item 13, press the OPEN BOOK symbol.

   OR

   To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

BALE SHAPE SENSORS

The bale shape sensor linkage must operate freely. Remove any buildup of material from the linkage. If the linkage does not operate freely, the sensor will be sending inaccurate signals to the controller.

To adjust and calibrate the sensor "empty" position:

1. Check to be sure the sensor arm is at the "empty" position. If it is not, move it to the empty position. If the linkage is binding, it should be freed before proceeding.
2. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the "full bale" size.
3. Press and release the OPEN BOOK key repeatedly to advance to item 13 for the left or item 14 for the right.

   The left of the display should read "13" or "14," the bottom segment of the left (13) or right (14) bar graph should be ON and flashing. A number should appear in the right of the display. This number should be between 1 and 245. The allowable range for the display is 11 to 245. If the number goes to 255, check the wiring harness for damage or a loose connection.

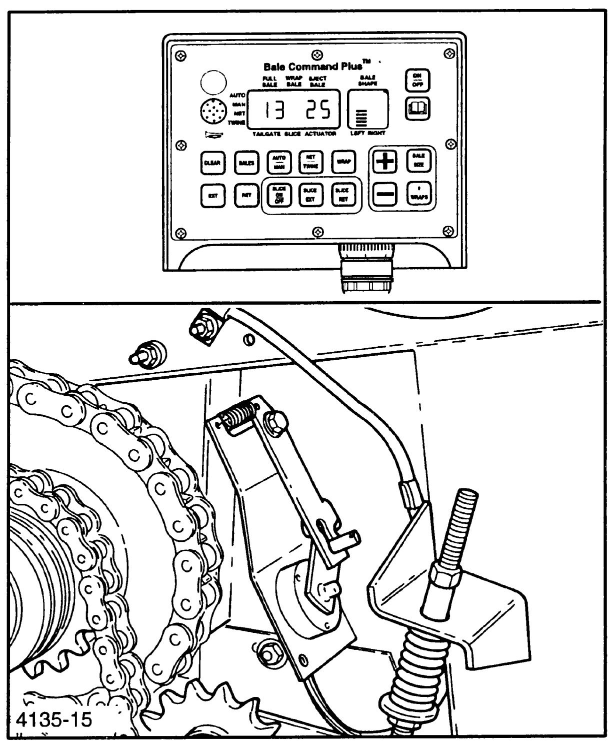


Figure 14-18

4. To adjust the sensor, loosen the sensor mounting bolts and rotate the sensor. The number on the display should change as the sensor is rotated. Rotate the sensor until the number is between 20 and 30 and tighten the mounting bolts.

5. Calibrate the "empty" position by pressing and holding the minus (-) key for one second until the alarm activates. The lower five segments of the selected bar graph will be turn on steady.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed, and the alarm will sound three short beeps.

6. Calibrate the full position by moving the sensor arm to the "full" position and installing a 1/8″ cotter pin, 1, in the hole in the arm. Allow the cotter pin to rest against the outside of the bale chamber.

7. Press and hold the plus (+) key for one second until the alarm activates. All segments of the appropriate bar graph will turn on solid.

   NOTE: The controller will not calibrate if the sensor "full" position reading is not between 100 and 245. An Er error message will be displayed at the right, and the alarm will sound three short beeps.

8. To clear an incorrect calibration, press and hold the CLEAR key for one second until the alarm activates. The bottom segment of the left bar graph will flash during the recalibration.

   Repeat the calibration procedure.

9. To advance to the next setup item – Press the OPEN BOOK symbol.

   OR

   To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

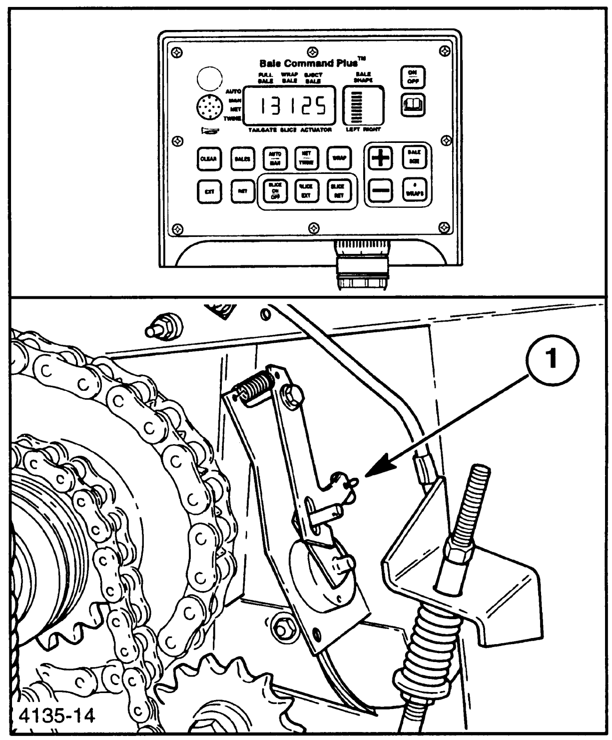


Figure 14-19

BALE SLICE ACTUATOR POSITION SENSOR

Setup/diagnostic item 15 is used to adjust and calibrate the Bale Slice actuator position sensor.

To adjust and calibrate the sensor:

1. Check to be sure the actuator is fully retracted. If it is not, use the SLICE RETract key to move it to the home position.
2. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate “1” and the “full bale” size.
3. Press and release the OPEN BOOK key repeatedly to advance to item 15.

   The left of the display should read “15,” the SLICE indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 20 and 30 when the actuator is in the home position.

   The allowable range for the display is 11 to 245. If the numbers decrease at any time while moving toward the slice position or if the number goes to 255, check the wiring harness for damage or a loose connection.
4. Adjust the sensor home position by loosening the sensor mounting bolts and rotating the sensor. The number on the display should change as the sensor is rotated. Rotate the sensor until the number is between 20 and 30 and then tighten the sensor mounting hardware.

   If the sensor cannot be adjusted so the reading is between 20 and 30, it may be necessary to loosen the two clamps attaching the sensor mount and reposition the mount.
5. Calibrate the sensor home position by pressing and holding the minus (-) key for one second until the alarm activates. The SLICE indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed, and the alarm will sound three short beeps.

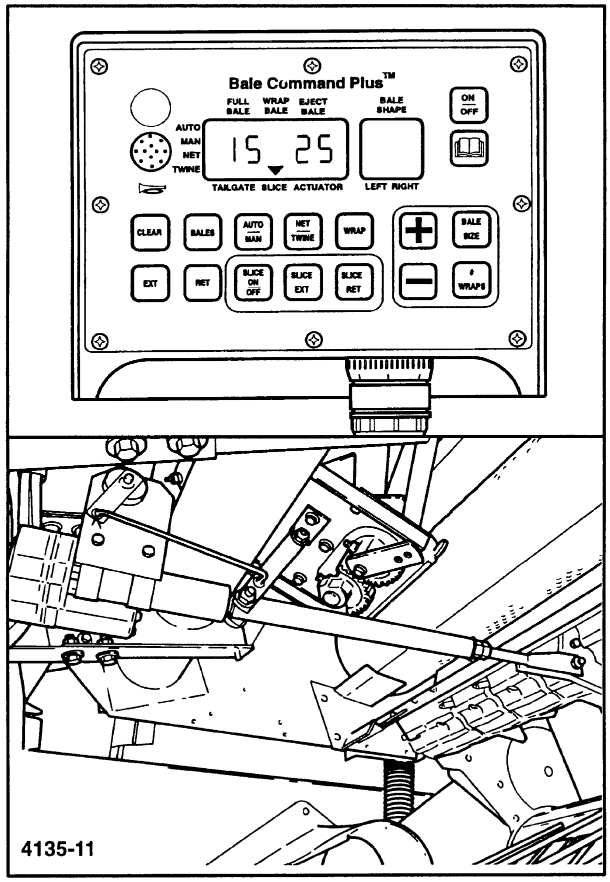


Figure 14-20

To calibrate the slicing position:

6. Move the actuator to extend the knives to the desired position using the SLICE EXTend key.
7. Press and hold the plus (+) key for one second until the alarm activates. The actuator indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor precut position reading is not BETWEEN 100 AND 240. An Er error message will be displayed at the right, and the alarm will sound three short beeps.

8. To clear an incorrect calibration, press and hold the CLEAR key for one second until the alarm activates. The actuator indicator will be on steady during the recalibration. Repeat the calibration procedure.
9. Retract the knives to the home position using the SLICE RETract key.
10. Exit the setup/diagnostic mode by pressing and holding the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

    NOTE: If the sensor is replaced be sure to adjust to the "home" position and then calibrate to the "home" and "slice" positions.

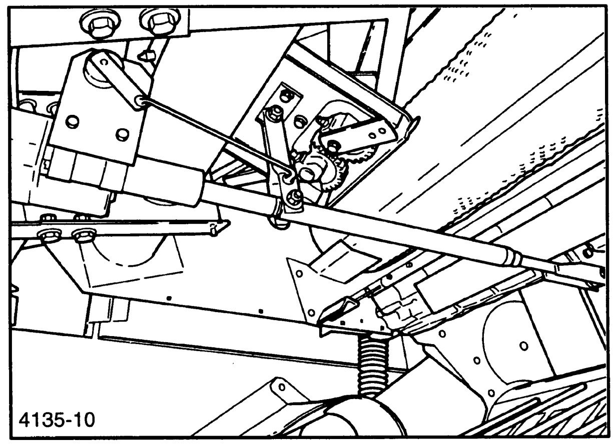


Figure 14-21

REPLACING ELECTRIC COMPONENTS

Operator's panel - backlights, relay, circuit breaker

The only serviceable parts inside the operator's panel, 1, are the circuit breaker, 2; relay, 3; the backlights, 4. The complete operator's panel should be sent to an authorized service center if the electronic components require servicing.

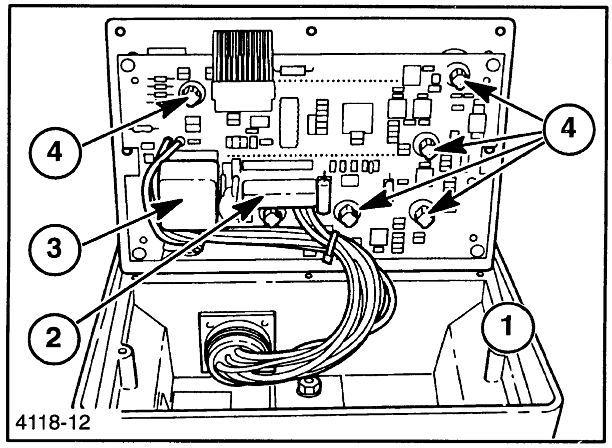


Figure 14-22

To replace a backlight, circuit breaker or relay:

Separate the display panel from the cover by removing the eight screws from the face of the display panel and then lifting the panel away from the case. Do not touch the electronic components on the panel.

Circuit breaker

The circuit breaker can be removed by pulling it from the sockets on the display panel. A slight rocking motion may be required.

Install a new circuit breaker by pushing it into the sockets until it snaps into position.

Relay

The relay can be removed by pulling it from the sockets on the display panel. A slight rocking motion may be required.

Install a new relay by pushing it into the sockets.

Light bulb and holder

A light bulb and holder can be removed from the socket by twisting it counterclockwise.

NOTE: Two styles of bulbs and holders are available. The one style requires a screwdriver for removal and installation while the other can be changed without the use of tools.

Place a new bulb and holder in the socket and turn it clockwise to lock it in position.

Align the holes in the bottom of the panel with the holes in the cover and install the four screws and lock washers.

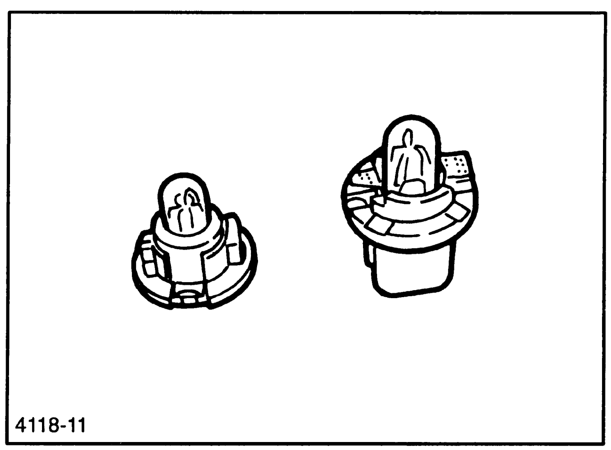


Figure 14-23

BALE SIZE SENSOR

CAUTION: BEFORE REPLACING THE BALE SIZE SENSOR, TURN THE BALE COMMAND PLUS SYSTEM OFF TO PREVENT THE ACTUATORS FROM MOVING WHILE WORKING ON THE BALER.

Removal

Disconnect the sensor from the wire harness.

Remove the cap screw, spacer, washer and lock nut at 1, attaching the bale size sensor arm to the strap from the take-up arm.

Remove the bracket, 2, and sensor assembly from the baler.

Remove the cotter pin in the shaft of the sensor arm and slide the shaft out of the sensor.

Remove the two bolts securing the sensor and remove the sensor from the bracket.

Inspect the arm shaft and the bushings in the brackets for wear or rust. Clean or replace as required. Each end of the pin that fits inside the sensor should extend an equal distance through the shaft.

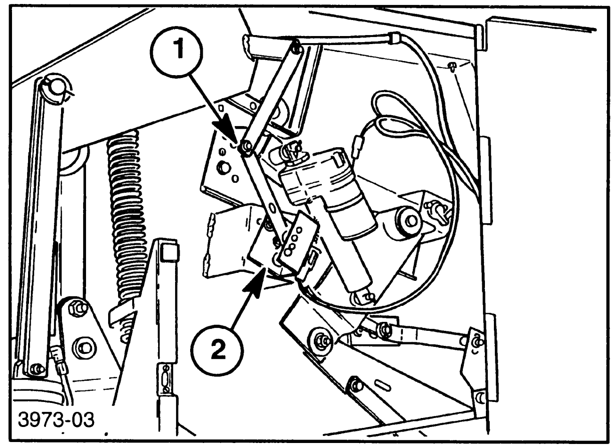


Figure 14-24

Installation

Model 644

Place the arm and shaft, 3, through the bushing in the bracket. The end of the shaft that has the pin through it should be towards the sensor.

Attach the sensor, 2, to the bracket, 4, and hub, 6, using two #8 x 1-1/2″ machine screws, lock washers and nuts. Place the screws through the sensor and place three flat washers, 5, on each screw before installing the sensor on the bracket. The hub, 6, should be outside the bracket. The wire harness should be at the bottom of the bracket.

Slide the arm and shaft through the sensor and bushing and install a 1/8″ x 3/4″ cotter pin at 7.

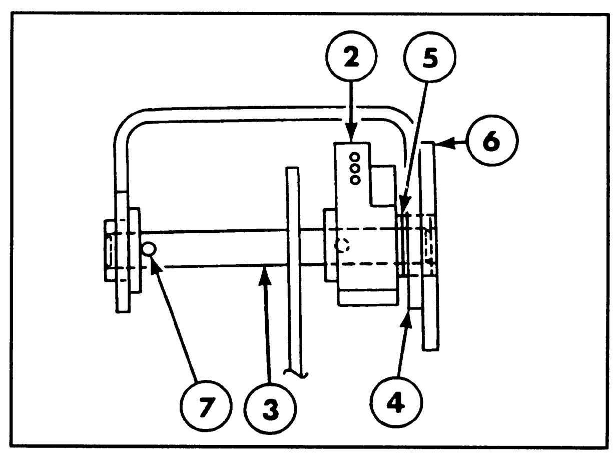


Figure 14-25

Models 654 and 664

Place the arm and shaft, 3, through the bushing in the bracket, 2. The end of the shaft that has the pin through it should be towards the sensor.

Attach the sensor, 2, to the bracket and hub using two #8 x 1″ machine screws and four nuts. Place the screws through the sensor and install a nut on each screw at 5 before installing the sensor on the bracket. The wire harness should be at the top of the bracket.

Slide the arm and shaft through the sensor and bushing and install a 1/8″ x 3/4″ cotter pin at 7.

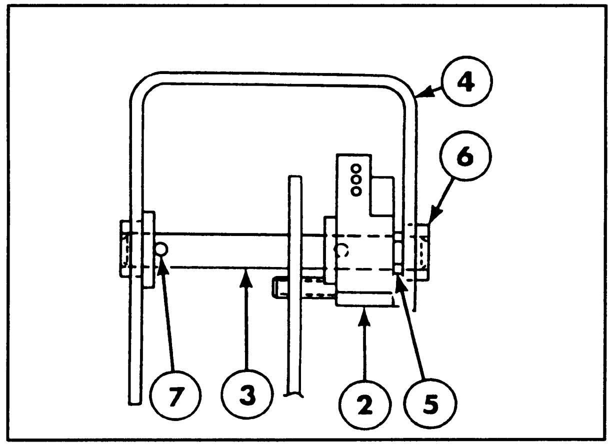


Figure 14-26

All Models

Install the bracket and sensor assembly on the baler. Do not tighten the bracket hardware until the sensor is adjusted. Do not install the bolt and spacer at 1 until the sensor operation is checked.

Reconnect the wiring harness to the sensor.

Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the "full bale" size.

Press and release the OPEN BOOK key repeatedly to advance to item 11.

The left of the display should read "11" and the FULL BALE indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 30 and 245.

NOTE: After selecting item 11 in the setup/diagnostic mode, the display should read between 33 and 245. If it does not, recheck the sensor and wire harness connection.

Rotate the sensor arm, 2. The number on the display should change as the arm is rotated. Move the arm from "empty" to "full" and back again.

IMPORTANT: Do not force the arm as the sensor may be damaged.

As the arm is moved to the "full" position, the numbers on the display should increase steadily until they reach a top reading of up to 245. As the arm is moved to the "empty" position, the numbers on the display should decrease steadily until they reach a low reading of 30 to 50.

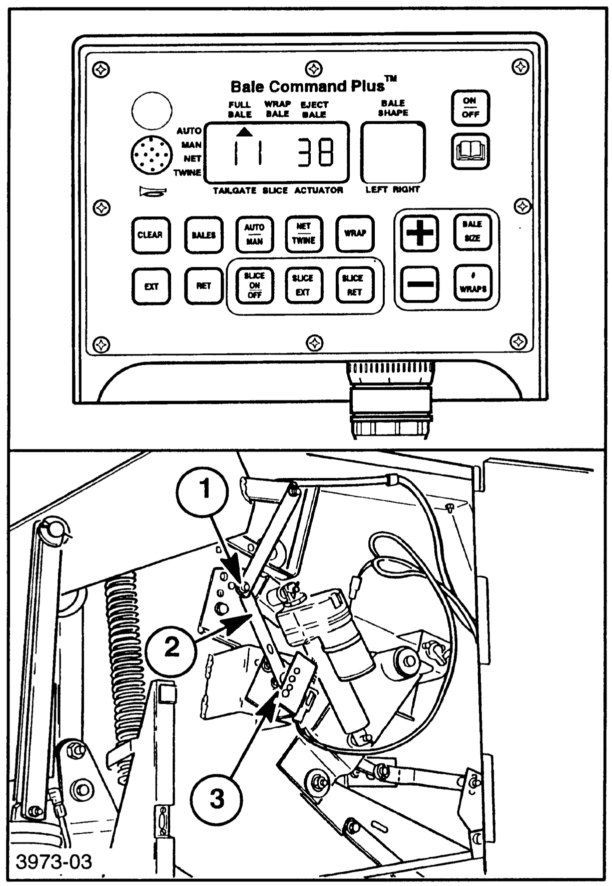


Figure 14-27

The allowable range for the display is 30 to 245.

If the numbers decrease at any time while moving toward the full position or if the number goes to 255, check the wiring harness for damage or a loose connection and test the sensor as described in "Diagnostic Test Procedures" later in this section.

If the sensor tests correctly, attach the arm and shaft to the strap from the takeup arm at 1, using an M8 x 20 cap screw, spacer, flat washer and locknut.

Adjust the bale size sensor mounting bracket as follows:

Rotate the sensor bracket, 3. The number on the display should change as the bracket is rotated. Rotate the bracket until the lowest number is displayed. Rotate the bracket again until the display reads 5 to 10 above the lowest number and tighten the bracket mounting hardware.

Press and hold the CLEAR key for 1 second (the alarm will beep) to calibrate the sensor to the initial factory setting.

NOTE: The controller must be calibrated to match the displayed size and actual bale size using setup item 1 after making and wrapping the first bale in automatic mode.

Exit the setup/diagnostic mode, by pressing and holding the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

The display should read "30" (or 75 if metric display is selected).

ACTUATOR, TWINE

Removal

Disconnect the actuator wire harness from the main harness.

Remove the cap screw, spacer and locknut at 1, connecting the actuator shaft to the twine wrapper pivot link.

Loosen the clamp bolt and slide the sensor, 2, and clamp off the actuator.

Remove the cotter pin from the mounting pin at the base of the actuator and remove the actuator.

Installation

Place the base of the actuator over the pivot pin and install a 1/8″ x 3/4″ cotter pin.

Slide the clamp and sensor assembly, 2, over the actuator and position the sensor so it cannot contact the magnets.

Install an M12 x 80 cap screw, spacer, 3, and locknut at 1, to attach the actuator shaft to the twine wrapper pivot link. The spacer should be below the link so it can contact the knife operating plate.

Connect the actuator wire harness to the main harness.

Turn the system ON and use the RETract key to completely retract the actuator.

Adjust the clamp and sensor so that the sensor is centered above the home position magnet, 4, when the actuator is completely retracted and tighten the clamp bolt.

Adjust the gap between the sensor and magnet to 3/16″ (5 mm).

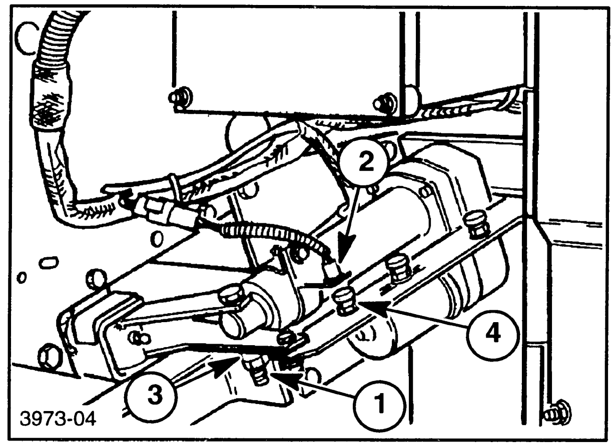


Figure 14-28

Set the precut position magnet, 1, so it is 1-15/16″ (49 mm) from the home position magnet, 2. Use the EXTend key to move the actuator so the sensor, 3, is centered over the precut magnet and adjust the magnet for a clearance of 3/16″ (5 mm) between the sensor and magnet.

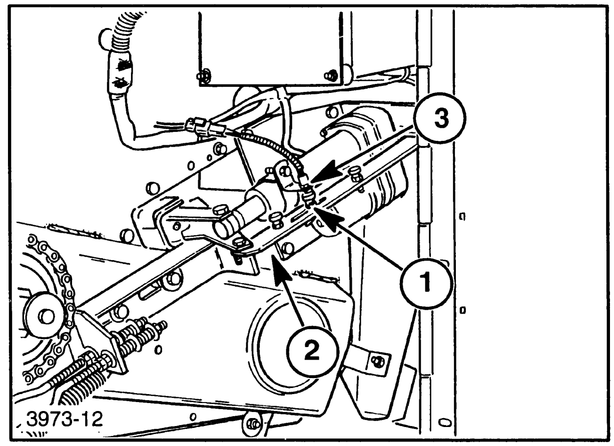


Figure 14-29

Extend the actuator until it ratchets. Adjust the extend position magnet, 1, so it is centered under the sensor, 2, and has a clearance of 3/16″ (5 mm) to the sensor.

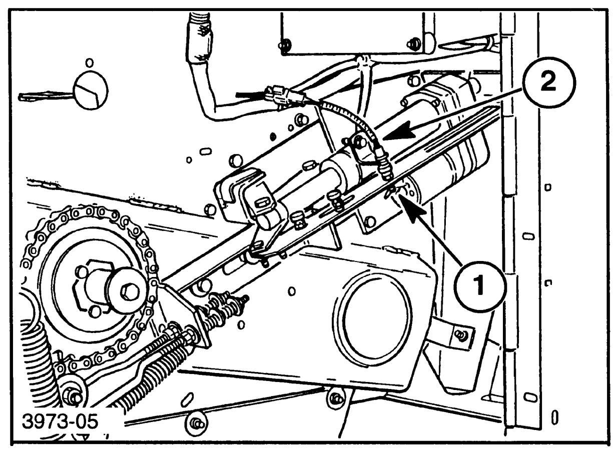


Figure 14-30

ACTUATOR, NET

Removal

Disconnect the actuator wire harness from the main harness, 1. It may be necessary to remove or loosen some cable ties.

Remove the cotter pins and washers securing the actuator, 2, to its mount and to the net wrapper pivot link.

Remove the actuator.

Installation

Place the actuator, 2, over the pins on the mount and pivot link. Install washers and 1/8″ x 1-1/4″ cotter pins to secure the actuator.

Connect the actuator wire harness to the main harness, 1.

Check to be sure the wire harness has clearance with all moving parts of the system. Install cable ties as required to secure the harness.

Turn the system ON and use the RETract key to completely retract the actuator.

Adjust and calibrate the actuator sensor home position

1. Check to be sure the actuator is fully retracted. If it is not, use the RETract key to move it to the home position.
2. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the "full bale" size.
3. Press and release the OPEN BOOK key repeatedly to advance to item 12.

   The left of the display should read "12," the NET indicator triangle should be ON and the ACTUATOR indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 20 and 30 when the actuator is in the home position.

4. Loosen the sensor mounting bolts and rotate the sensor and mount until the number is between 20 and 30 and then tighten the sensor mounting hardware.

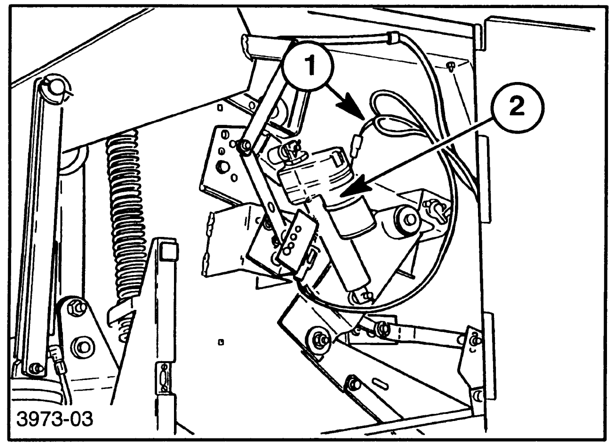


Figure 14-31

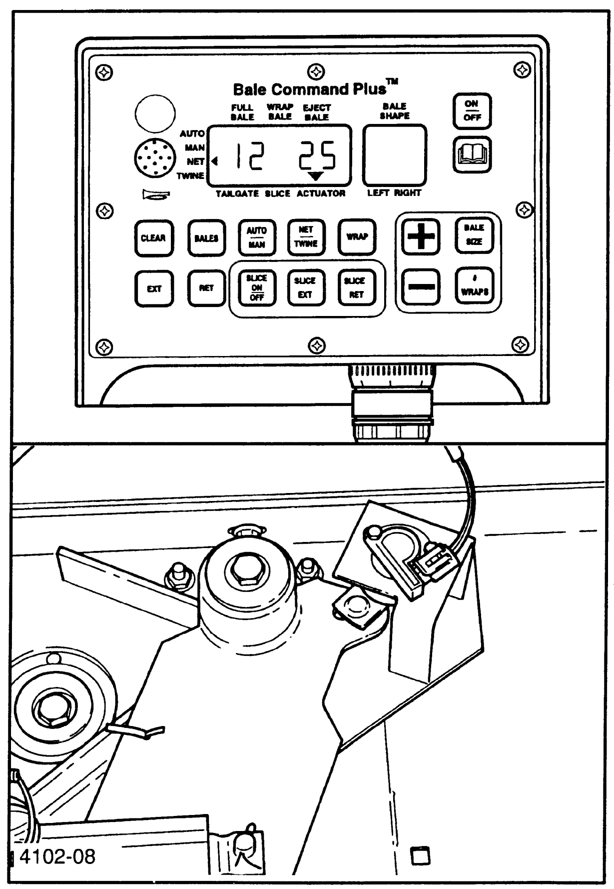


Figure 14-32

5. Calibrate the sensor by pressing and holding the minus (-) key for one second until the alarm activates. The actuator indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed and the alarm will sound three short beeps.

   The precut position is set automatically when calibrating the home position.

6. Exit the setup/diagnostic mode by pressing and holding the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

POSITION SENSORS

Magnetic switches and magnets are used to sense the position of the twine actuator and tailgate latch and also to count the revolutions of the counter roll. All of the magnetic sensors on the baler are the same. If the operator is using only twine or only net, a sensor can be "borrowed" from the unused circuit until a replacement is obtained.

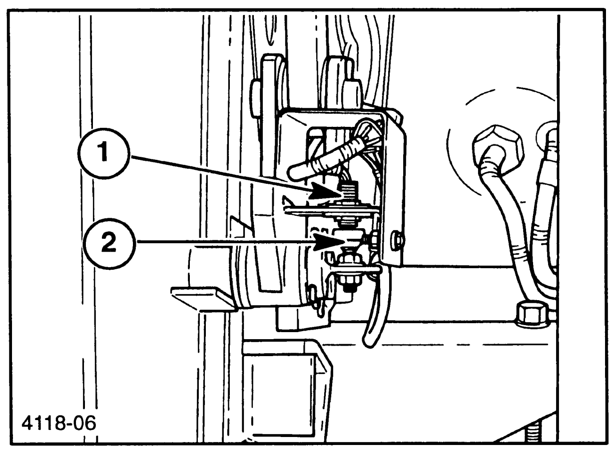


Figure 14-33

To remove a sensor

Disconnect the sensor connector from the harness connector by pressing the tab on the harness connector and pulling the connectors apart.

Remove the jam nut near the end of the sensor, 1, closest to the magnet, 2, and remove the sensor from its mount.

To install a sensor

Position a jam nut near the center of the sensor, 1.

Place the sensor in its mount and install, but do not tighten, a second jam nut.

Use the two jam nuts to adjust the clearance between the sensor and magnet, 2, as follows:
Tailgate sensor 1/8″ (3 mm)
Twine actuator sensor 3/16″ (5 mm)
Counter roll sensor 1/16″(1.5 mm).
Then tighten the jam nuts.

Connect the sensor connector to the harness connector by pushing them together.

To remove a magnet and stud

Remove the nut, 1, from the magnet mounting stud, 2, and remove the magnet and stud from its mount. If the magnet is too close to the sensor, it may be necessary to reposition the actuator using the EXTend or RETract key or to open the tailgate to gain clearance to remove the magnet.

To install a magnet and stud

Install a flanged nut, 3, as far as possible on the magnet stud, 2, with the flange facing away from the magnet. Position the magnet and stud in the mount and install a second flanged nut, 1. Position the magnet under the sensor. Use the two nuts to adjust the clearance between the sensor and magnet as follows:

Tailgate sensor 1/8″ (3 mm)

Twine actuator sensor 3/16″ (5 mm).

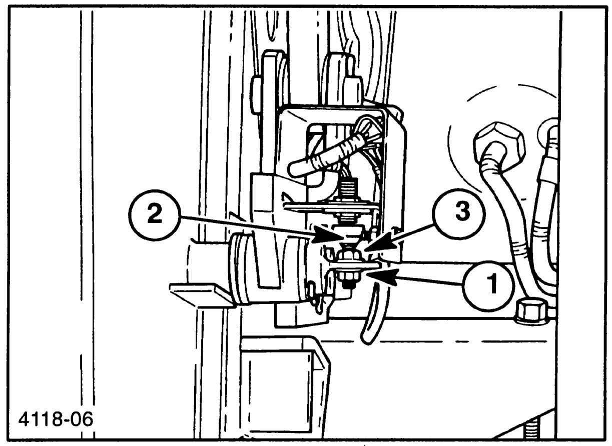


Figure 14-34

Counter roll sensor and magnet

The counter roll sensor, 1, is the same as the tailgate latch and twine actuator position sensors and can be replaced using the same procedure.

The counter roll magnet, 2, is mounted in a hub, 3, pressed into the end of the counter roll, 4, and secured with Loctite.

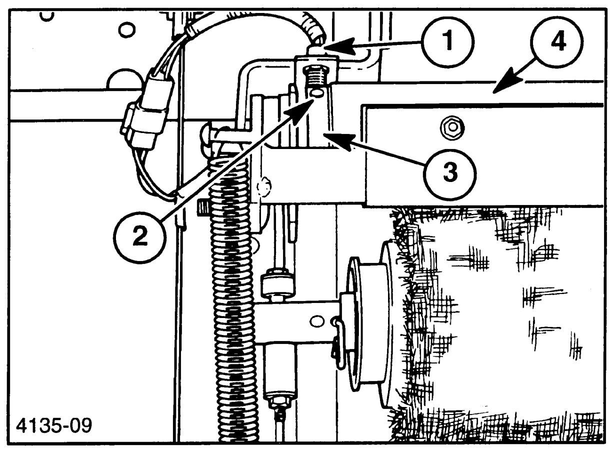


Figure 14-35

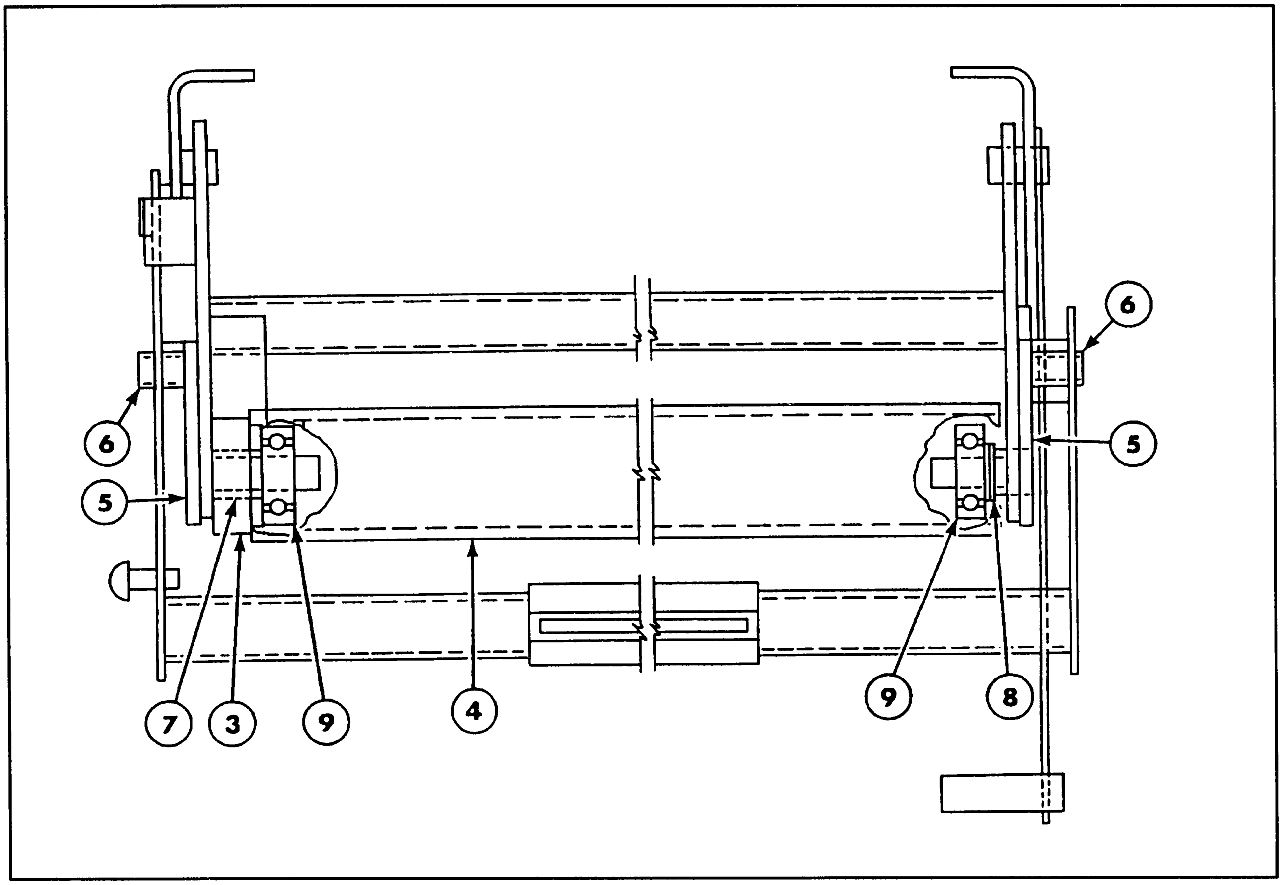


Figure 14-36

To replace the magnet and hub:

Remove the counter roll, 4, from the baler by removing the shaft and plate, 5, and spacer, 6, at each end of the roll. There is a spacer, 7, at the sensor end of the roll and washer(s), 2, at the other end.

Separate the hub, 3, from the roll by heating to approximately 450° F (232° C) to soften the retaining compound. Do not overheat.

Inspect the roll bearings, 9, and replace if required.

To install the magnet and hub:

Clean the mating surfaces of the new hub, 3, and the roll, 4, and apply a thin coat of thread-locking Loctite 242 (or equivalent) before pressing the hub into the roll.

Reinstall the counter roll and magnet assembly using shaft and plates, 5, and spacers, 6. Be sure to install spacer, 7, at the sensor end of the roll.

Use washers at 8 to reduce end play of the roll to a minimum so the magnet will stay aligned with the sensor.

NOTE: If too many washers are used at 8, the roll may not spin freely and will provide an inaccurate reading to the controller which in turn will apply too much net to the bale.

WIRE HARNESS CONNECTOR REPAIR

Deutsche-type wire harness connectors are used in the Bale Command Plus system to connect the harnesses to the controller, junction box and operator's panel. The connectors can be repaired using the tools in the FNH01000 tool kit shown. The tool kit also includes tools used to service other types of connectors.

The tools in the kit that are required for the Bale Command Plus harnesses are:

Reference No.	Description
1	Electrician's pliers
2	Crimping pliers
3	Extraction tools

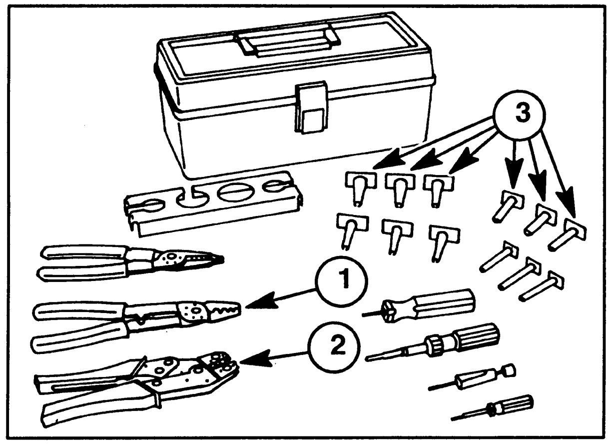


Figure 14-37

Connector Repair Procedures

Installing a new ring on a plastic connector body.

If the ring, 1, on a plastic connector body is broken, it can be replaced with a new one without removing the connector from the harness. Remove all parts of the broken ring. Align the new ring with the end of the body, 2, and carefully push it over the rib on the body.

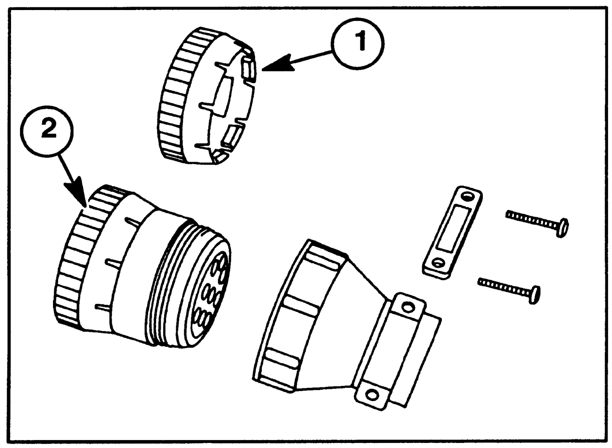


Figure 14-38

Replacing a Connector Body

The same procedure is used for both the plastic connector as shown at the top of Figure 14-39 and for the metal connectors as shown at the bottom.

Remove the cable clamp, 1, from the connector.

Unscrew the clamp end cap, 2.

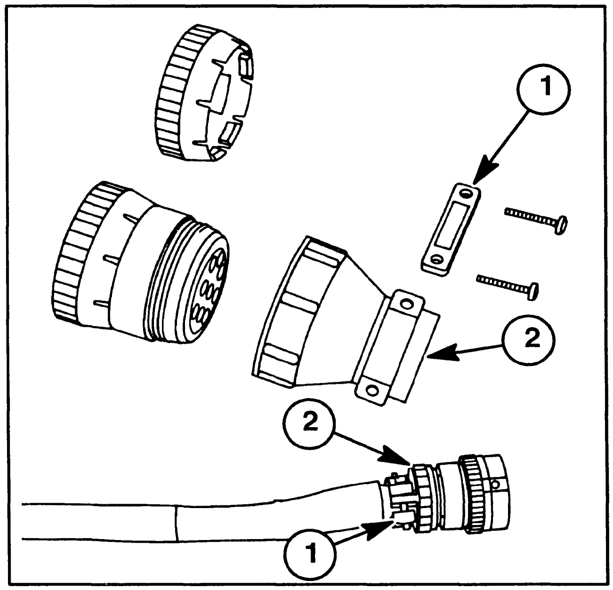


Figure 14-39

Slide the rubber boot(s), 3, over the harness as far as possible to expose the wires.

Remove the wires from the connector as described below.

Install the wire terminals in the new connector as described on the next page.

NOTE: Refer to the appropriate wiring diagram to determine the correct hole location for each wire. Install a plug in any unused holes in the connector.

Reinstall the rubber boot(s), 3, clamp end cap, 2, Figure 14-39, and cable clamp, 1, Figure 14-39.

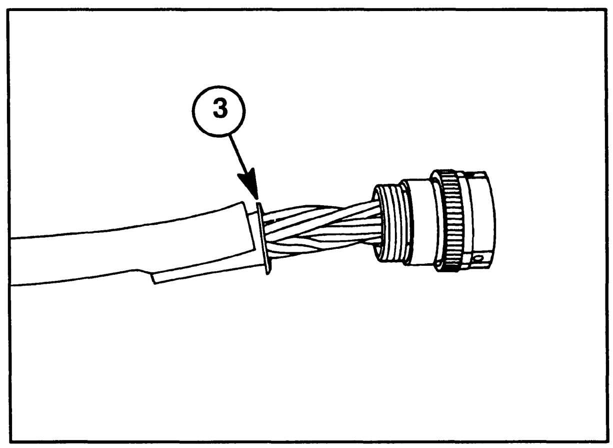


Figure 14-40

Removing a wire from a connector

Position the correct size extraction tool, 1, on the wire to be removed from the connector as shown.

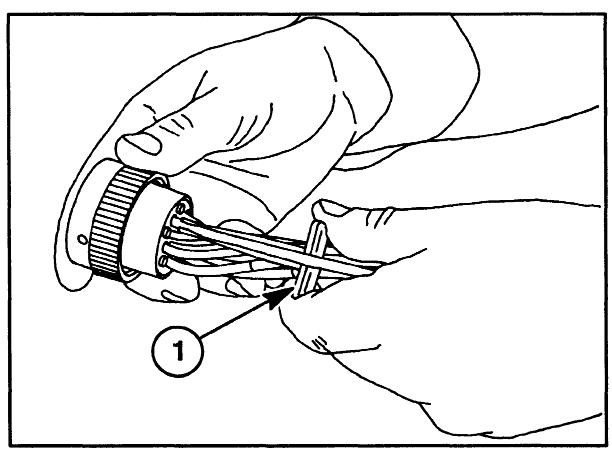


Figure 14-41

Slide the tool along the wire and into the connector as shown until the tool unlocks the terminal from the connector body. This can usually be detected by listening for a "click" as the terminal is released.

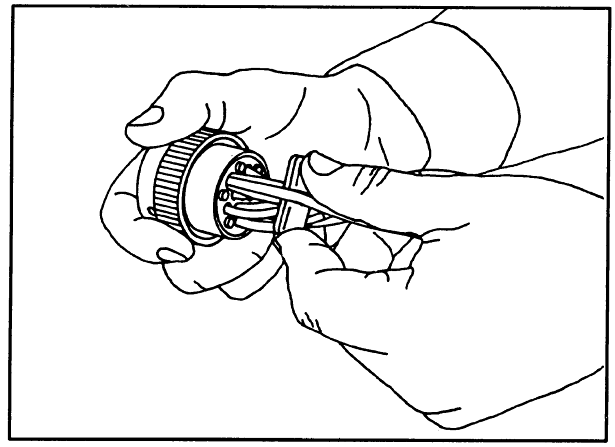


Figure 14-42

Pull the wire, tool, and terminal from the connector as shown.

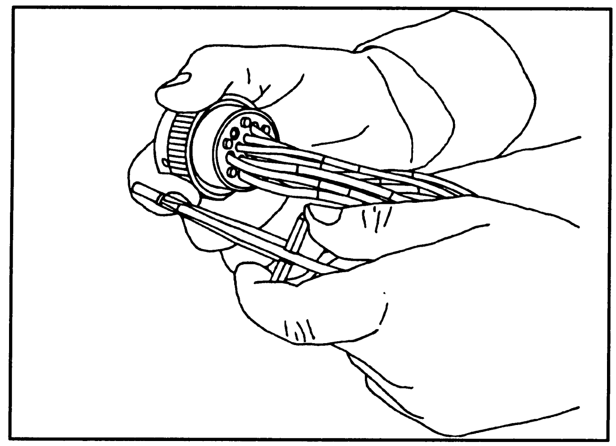


Figure 14-43

Installing a terminal in a connector

To install a terminal in a connector, simply push the terminal and wire into the appropriate hole in the connector until it "clicks" into place.

NOTE: It is usually easier to use the extraction tool to reinstall the terminal. This can be done by placing the tool on the wire and part of the terminal as shown and then pushing the tool and wire into the connector as shown until the clamp release is detected. Remove the tool and check to be sure the terminal is locked in the connector.

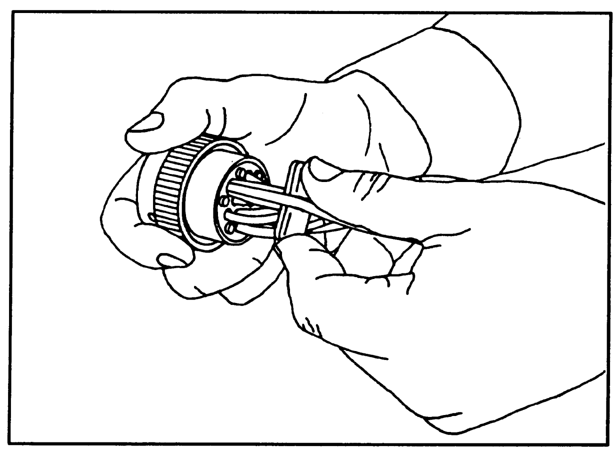


Figure 14-44

Wire stripping

Select the stripping hole in the electricians' pliers, 1, Figure 14-37, that corresponds with the gauge of the wire.

NOTE: The stripped length of the wire should not be more than 1/32″ (0.8 mm) longer than the barrel in the terminal to be installed.

Rotate the pliers around the wire at least 180° to ensure that the insulation is cut completely.

Pull the wire from the pliers to remove the cut insulation as shown.

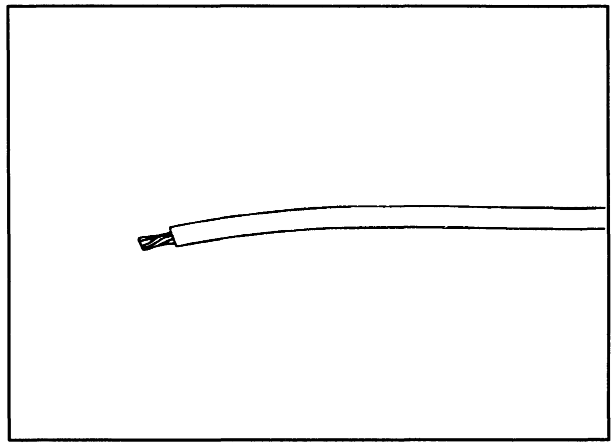


Figure 14-45

Terminal installation on a wire

Strip the wire end as previously described.

Position the new terminal, 1, in the proper gauge hole in the crimping pliers, 2, and lightly squeeze the handle to grip the terminal.

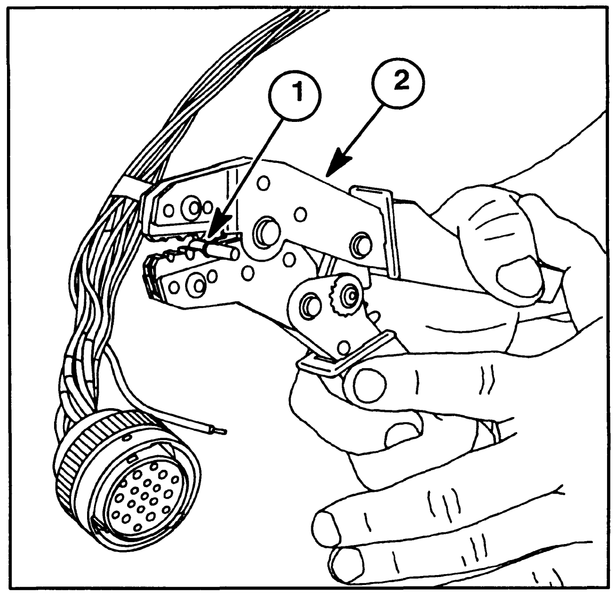


Figure 14-46

Insert the stripped end of the wire into the terminal as shown.

Squeeze the plier handles until the handles will open again.

NOTE: The tool handles will not open until they have been closed to a complete crimp position.

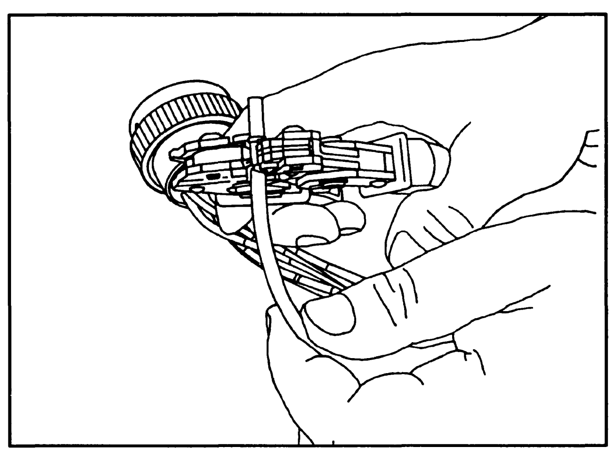


Figure 14-47

Remove the wire end and terminal from the pliers. The terminal should be crimped on the wire as shown.

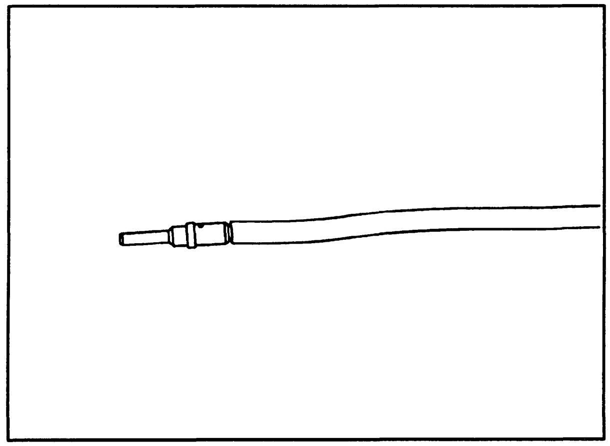


Figure 14-48

Solder the terminal to the wire with rosin core solder. Heat the terminal as shown. Add the solder through the small hole in the terminal until it flows out along the wire. Remove excessive solder from the outside of the wire.

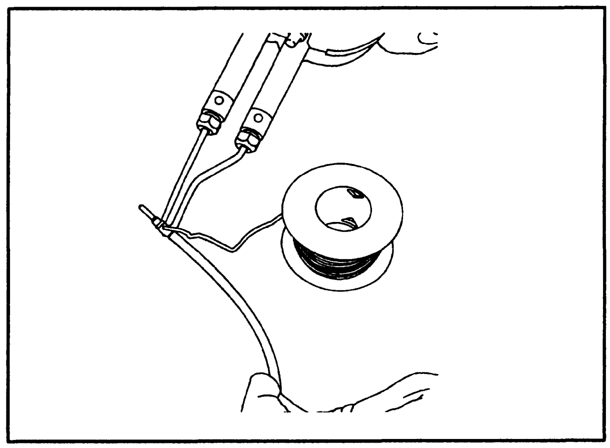


Figure 14-49

TROUBLESHOOTING

The troubleshooting section of this manual is arranged in the following sequence:

General Information
Electrical diagrams
Error messages
Self-diagnostic tests
Actuator tests
Charts listing problems, possible causes and solutions

GENERAL INFORMATION

IMPORTANT: Before performing any test or replacing any parts, check to be sure that all electrical connections are clean and free of rust or corrosion and that they are connected properly.

Use dielectric grease on the electrical connector pins. This grease lubricates the pins, reducing the possibility of corrosion, and provides good electrical continuity between mating parts. This grease will collect dust and dirt if left exposed, so protect all connectors when they are disconnected.

NOTE: Before troubleshooting the electronic portion of the Bale Command Plus system, be sure that the correct model and display measurement system are selected, as described in the following pages and, if possible, that the system is calibrated. Refer to the Setup/Diagnostic section in the Bale Command Plus Operator's Manual for additional information.

Inch/Metric Selection

The Bale Command Plus system can be set to display the bale size in either inches or centimeters.

To change the inch/metric selection:

1. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate “1” and the full bale size.
2. Press and release the OPEN BOOK key repeatedly to advance to item 7. When set to display the bale size in inches, “USA” will be displayed as shown. When set to display the bale size in centimeters, “Eur” will be displayed.
3. Press either the + (plus) or - (minus) key to change the display between inches and centimeters.
4. To advance to the setup item 7 (Model number) - press the OPEN BOOK symbol.

   OR

   To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

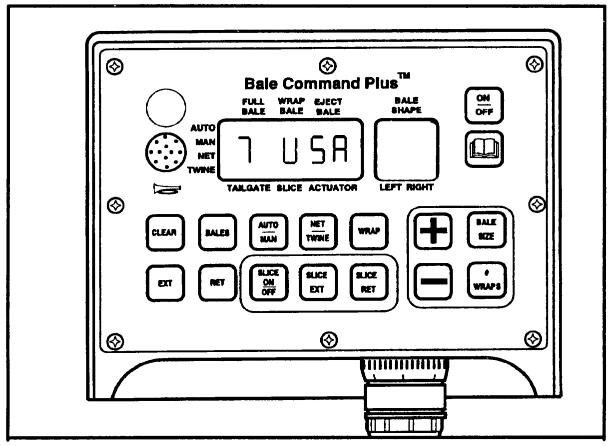


Figure 14-50

Model Number Selection

Item 8 in the setup/diagnostic mode displays the model the controller is programmed to operate. For the Bale Command Plus system to operate properly, the operator's panel **display must match the baler model number**. The Bale Command Plus system is programmed to operate the following baler models: 644, 654, 664, 5950 and 5980.

To check and/or change the model number:

1. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the full bale size.
2. Press and release the OPEN BOOK key repeatedly to advance to item 8. The display should indicate "8" and the model number. In the example, Model 644 is shown.
3. Press either the + (plus) or - (minus) key to scroll through the model numbers available. Pressing + (plus) repeatedly will scroll up through the model choices while pressing - (minus) repeatedly will scroll down through the model numbers.
4. Exit the setup/diagnostic mode by pressing and holding the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

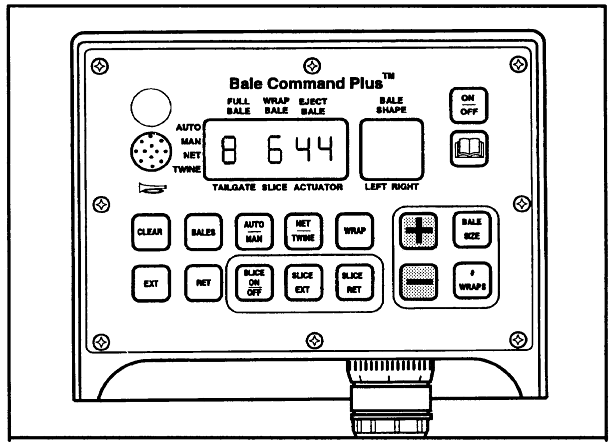


Figure 14-51

Bale Size Calibration

The bale size calibration feature is used to calibrate the controller to make a bale that is the same size as is shown on the display panel. Calibration should be performed when the size of bale made is not the same as the full bale size displayed, and whenever the bale size sensor or controller has been adjusted or replaced.

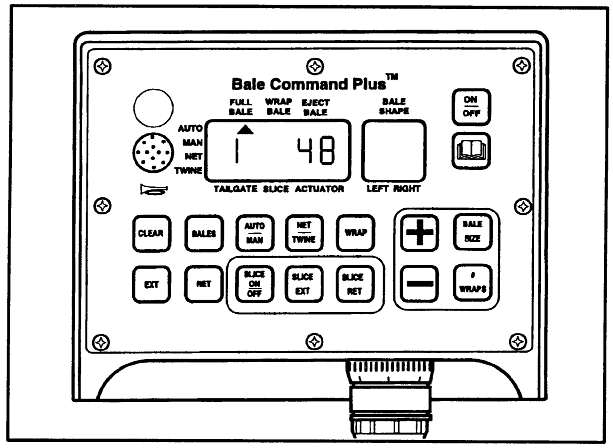


Figure 14-52

Make a bale and wrap it in the normal automatic mode.

Measure the bale diameter both horizontally and vertically and average the two measurements.

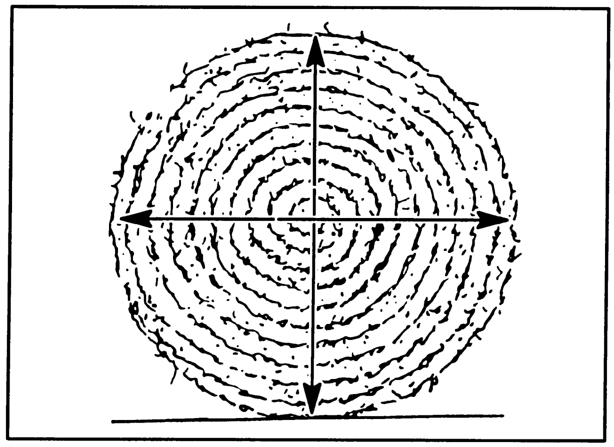


Figure 14-53

If the measured bale size is not the same as the displayed size, calibrate the controller as follows.

1. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the full bale size desired. The "1" and full bale indicator should be flashing.
2. Use the + (plus) or - (minus) key to change the bale size displayed to the measured size.
3. Press and hold the BALE SIZE key for one second. The alarm will be activated and the FULL BALE indicator will turn ON steady for one second indicating that the calibration is complete.
4. Press and hold the OPEN BOOK key for two seconds to exit the setup/diagnostic mode and return to normal operation. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

   OR

   To advance to other setup items - press the OPEN BOOK symbol.

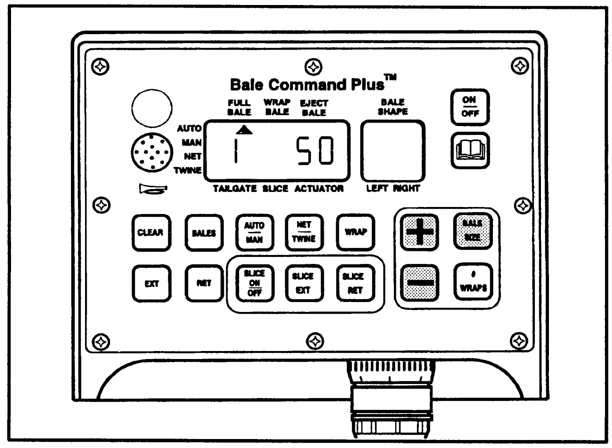


Figure 14-54

Manual Operation of the Actuators

With the Bale Command Plus system turned ON, pressing the EXTend key, 1, or RETract key, 2, on the operator's panel will cause the actuator for either the net or twine, as selected by the Net/Twine key, to extend or retract. The EXTend and RETract keys will control the actuator in both the AUTOmatic and MANual modes.

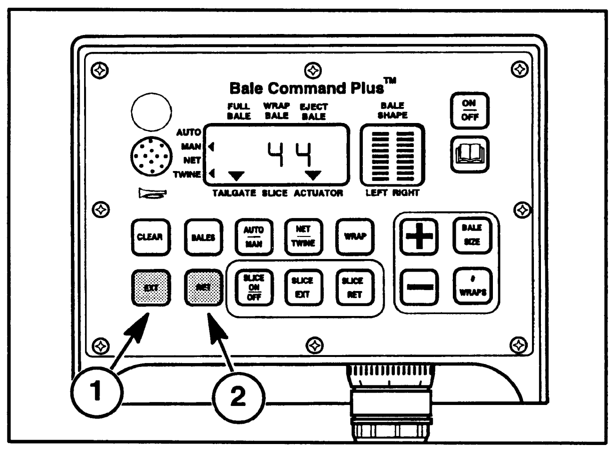


Figure 14-55

ELECTRICAL DIAGRAMS

The source of many electrical problems can be located by referring to an electrical diagram and using either a 12-volt test light, 1, or volt/ohmmeter, 2, to test the circuits involved. Special wire leads, 3, (tool #FNH00550), are available to check the wires in a multi-pin Deutsche-type connector while the system is operating.

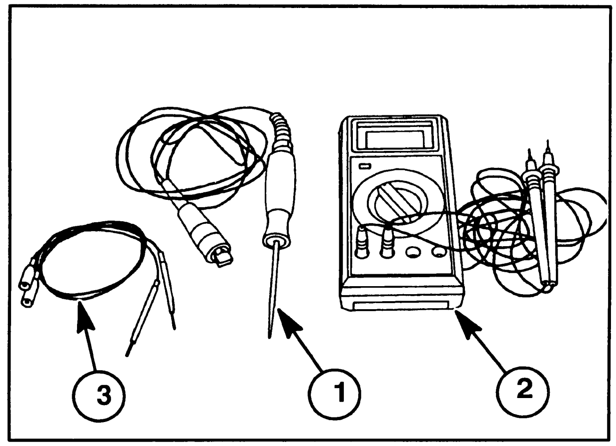


Figure 14-56

To use the special leads, remove the clamp from the connector, unscrew the clamp housing, 1, and slide any boots, 2, away from the connector. Insert the lead(s), 3, beside the wire(s) to be checked. Connect either a 12-volt test light or volt/ohmmeter, 4, as required to the leads to test the circuits involved.

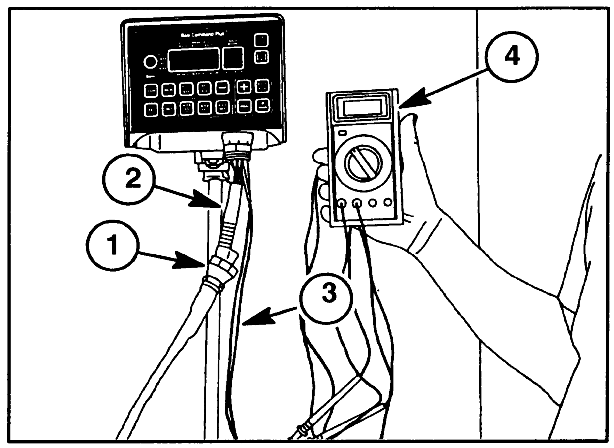


Figure 14-57

Figure 14-58 shows the wire harnesses for a machine with the optional Bale Slice installed connected to the controller. Connector 1 connects the machine harness to the controller. Connector 2 connects the controller to the Bale Slice actuator and sensor.

The machine harness is also connected to the tractor harness, the actuators, and the sensors.

The tractor harness is connected to the main harness, a power supply, and the operator's panel.

The Bale Slice harness is connected to the Bale Slice actuator and sensor.

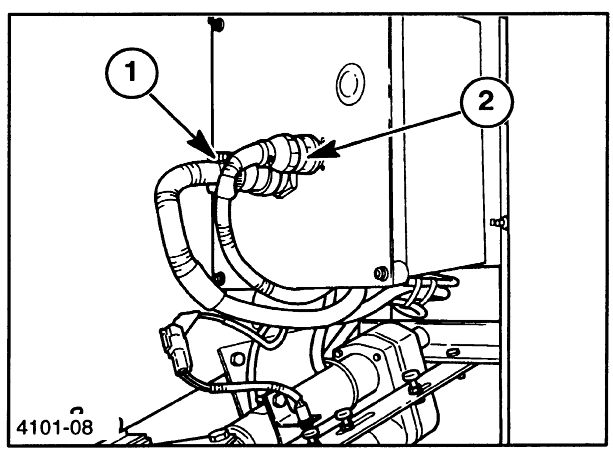


Figure 14-58

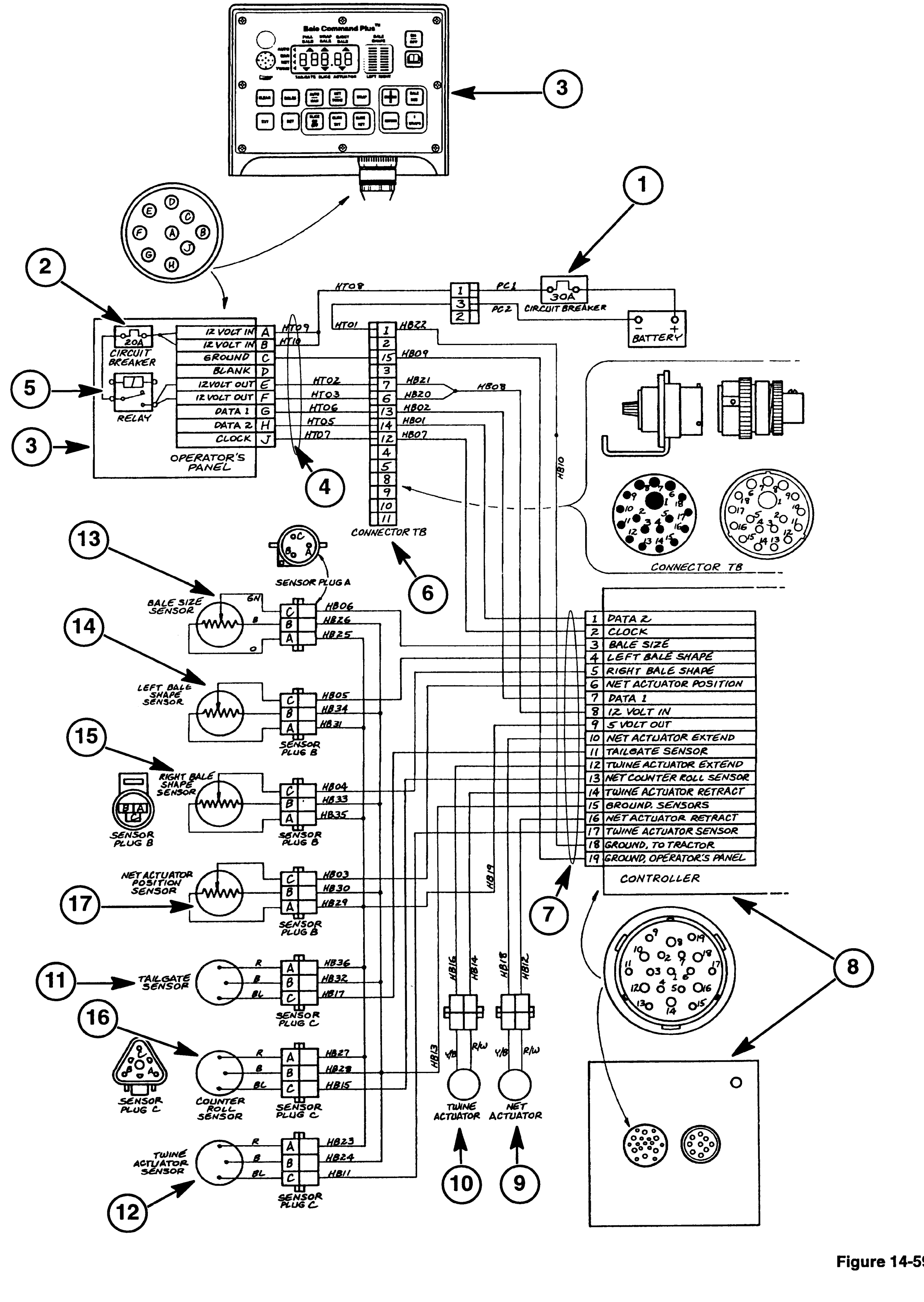

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
30A
CIRCUIT BREAKER
PC1
PC2
BATTERY
HT08
HT09
HT10
HT01
20A
CIRCUIT BREAKER
RELAY
12 VOLT IN A
12 VOLT IN B
GROUND C
BLANK D
12VOLT OUT E
12 VOLT OUT F
DATA 1 G
DATA 2 H
CLOCK J
OPERATOR'S PANEL
HT02
HT03
HT06
HT05
HT07
HB22
HB09
HB21
HB20
HB02
HB01
HB07
HB08
HB10
CONNECTOR TB
SENSOR PLUG A
BALE SIZE SENSOR
HB06
HB26
HB25
LEFT BALE SHAPE SENSOR
HB05
HB34
HB31
SENSOR PLUG B
RIGHT BALE SHAPE SENSOR
HB04
HB33
HB35
NET ACTUATOR POSITION SENSOR
HB03
HB30
HB29
TAILGATE SENSOR
HB36
HB32
HB17
SENSOR PLUG C
COUNTER ROLL SENSOR
HB27
HB28
HB15
TWINE ACTUATOR SENSOR
HB23
HB24
HB11
HB19
HB13
HB16
HB14
HB18
HB12
TWINE ACTUATOR
NET ACTUATOR
1 DATA 2
2 CLOCK
3 BALE SIZE
4 LEFT BALE SHAPE
5 RIGHT BALE SHAPE
6 NET ACTUATOR POSITION
7 DATA 1
8 12 VOLT IN
9 5 VOLT OUT
10 NET ACTUATOR EXTEND
11 TAILGATE SENSOR
12 TWINE ACTUATOR EXTEND
13 NET COUNTER ROLL SENSOR
14 TWINE ACTUATOR RETRACT
15 GROUND. SENSORS
16 NET ACTUATOR RETRACT
17 TWINE ACTUATOR SENSOR
18 GROUND, TO TRACTOR
19 GROUND, OPERATOR'S PANEL
CONTROLLER

Figure 14-59

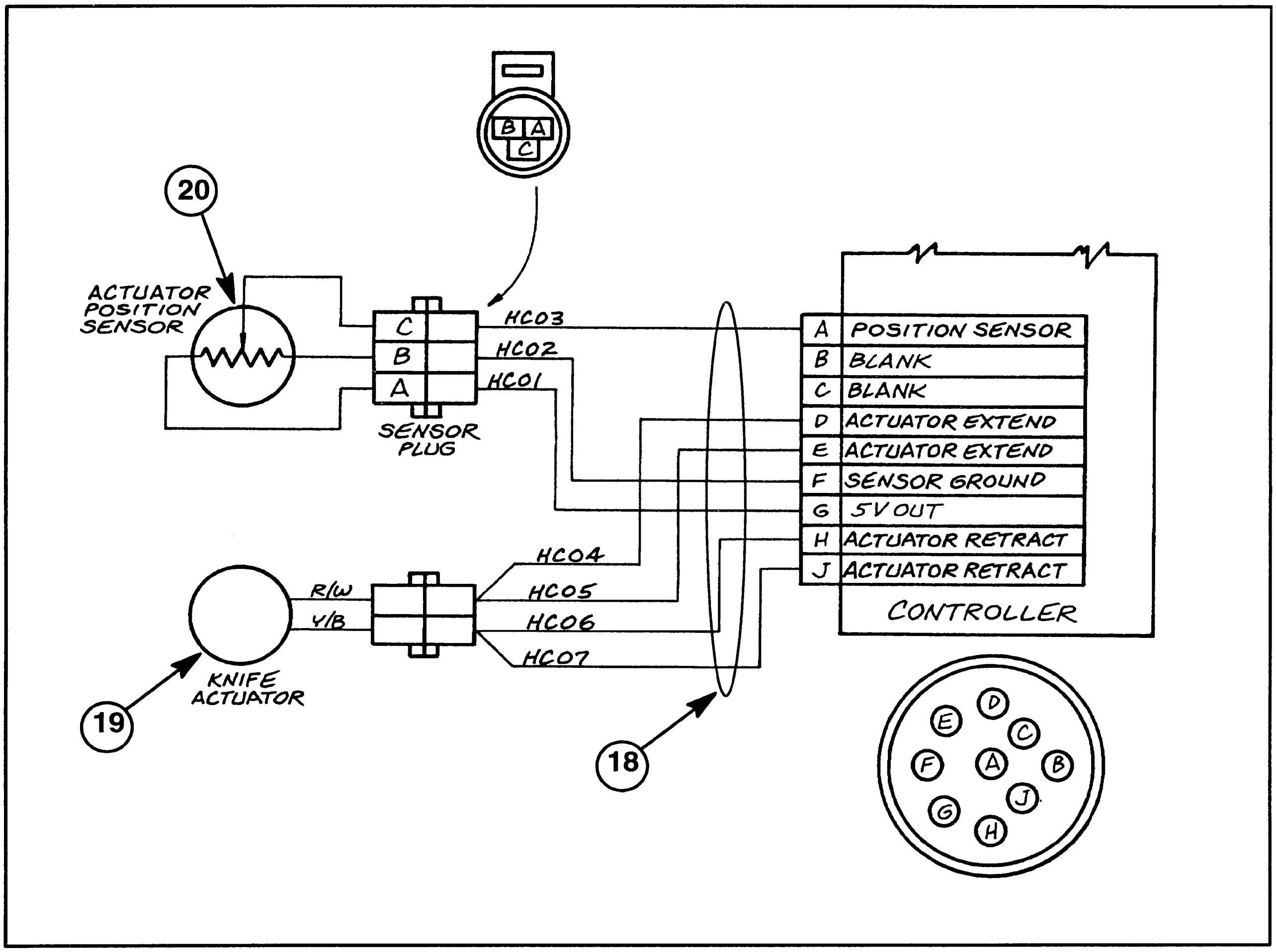


Figure 14-60

Figure 14-59 is the electrical diagram for the Bale Command Plus system without the Bale Slice option. The controller on machines with the Bale Slice have an additional connector for the Bale Slice harness.

Figure 14-60 is the electrical diagram for the additional components used with the Bale Slice system.

A 30-amp circuit breaker, 1, protects the entire system. 12 volts from the tractor battery (or starter) goes to a 20-amp breaker, 2, in the operator's panel, 3, through the main tractor harness, 4. When the system is turned ON, power is sent from a relay, 5, to the baler through the baler harness connector, 6. The baler harness, 7, is connected to the controller, 8; the net actuator, 9; the twine actuator, 10; plus the tailgate, 11; twine actuator position, 12; bale size, 13; bale shape sensors, 14 and 15; net counter roll sensor, 16; and net actuator position sensor, 17.

If the Bale Slice is installed, another harness, 18, connects the controller to the knife actuator, 19, and position sensor, 20.

ERROR MESSAGES AT START-UP

The Bale Command Plus system goes through a self test when it is turned on. If a problem is found, the operator is alerted by the audible alarm and an Error message and/or flashing pointer on the display on the operator's panel.

If Error is displayed, there will also be an indicator triangle on the display to indicate what circuit of the system is causing the problem.

Pressing the CLEAR key will cancel the alarm.

The following are errors that may appear:

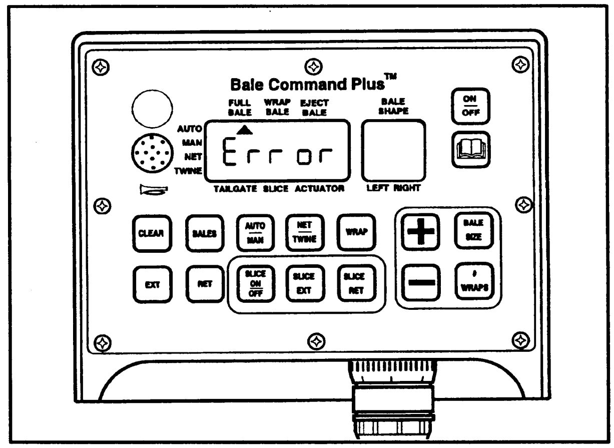


Figure 14-61

Error and the FULL BALE pointer is flashing - Bale size circuit

The bale size should indicate 30 (75 if metric display is selected) when the system is turned ON with an empty bale chamber.

Check to be sure the sensor is adjusted correctly and that the take-up arm is in the home position before checking the wiring or testing the sensor.

Error and TAILGATE pointer is flashing - Tailgate sensor circuit

The sensor must indicate that the tailgate is closed and latched before starting to make a bale.

Check to be sure the sensor is adjusted correctly and that the tailgate is closed and latched before checking the wiring.

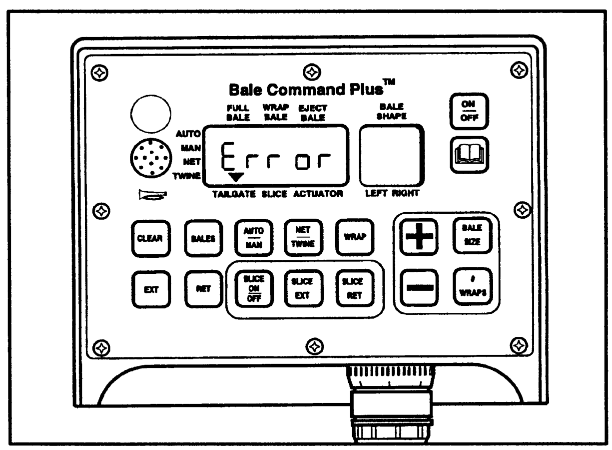


Figure 14-62

Error and ACTUATOR pointer is flashing - Net actuator circuit.

The sensor must indicate that the actuator is in the home position before starting to make a bale.

Check to be sure the sensor is adjusted correctly and that the actuator is in the home position before checking the wiring or testing the sensor.

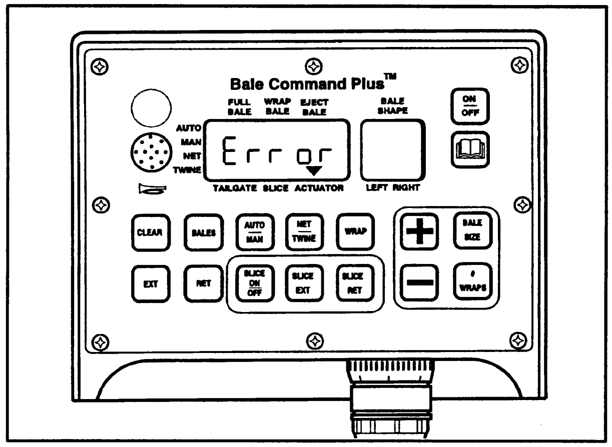


Figure 14-63

ERROR MESSAGES WHILE OPERATING

The operator's panel will provide a visual and/or audible warning if the controller detects a problem while forming the bale, while wrapping the bale, or after the bale is ejected. The pointers on the display will flash if a problem is detected and, depending on the problem, an Error message will also be displayed. When the Error message appears, the operator's panel will also beep. The flashing pointer will indicate which circuit caused the problem.

If the tailgate sensor is open for 15 seconds while forming the bale or if the net actuator is not home for 10 seconds, an Error message will appear.

If the tailgate sensor opens (even briefly) while the bale is being wrapped, an Error message will be displayed.

Pressing the CLEAR key will cancel the alarm.

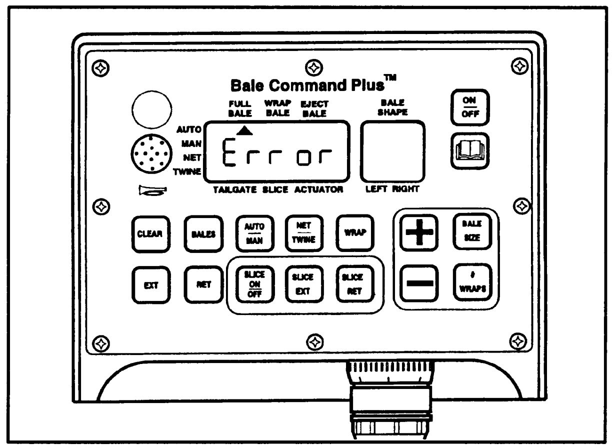


Figure 14-64

Error and the FULL BALE pointer is flashing - Bale size Sensor circuit

Error and TAILGATE pointer is flashing - Tailgate sensor circuit

Check to be sure the sensor is adjusted correctly and that the tailgate is closed and latched before checking the wiring.

NOTE: If the tailgate sensor fails on a net/twine machine and the operator is using only net or only twine, a sensor can be "borrowed" from the other system until a replacement is obtained.

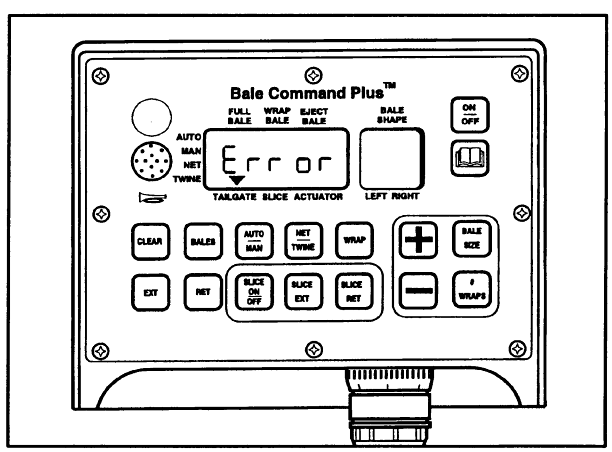


Figure 14-65

Error and ACTUATOR pointer is flashing - Net or twine actuator circuit.

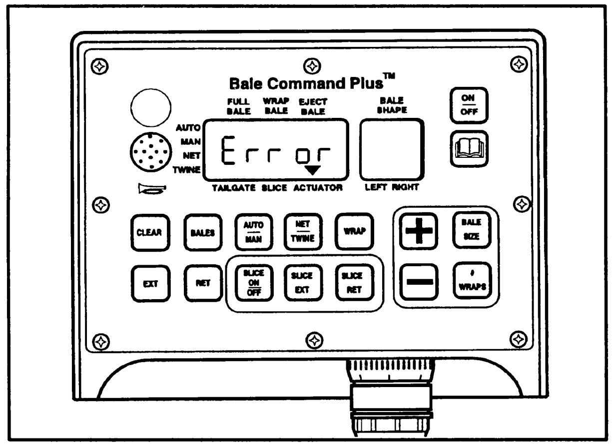


Figure 14-66

Er 01

An Er 1 indicates that the net or twine actuator stalled or lost power and did not move to the end of its stroke within 5 seconds.

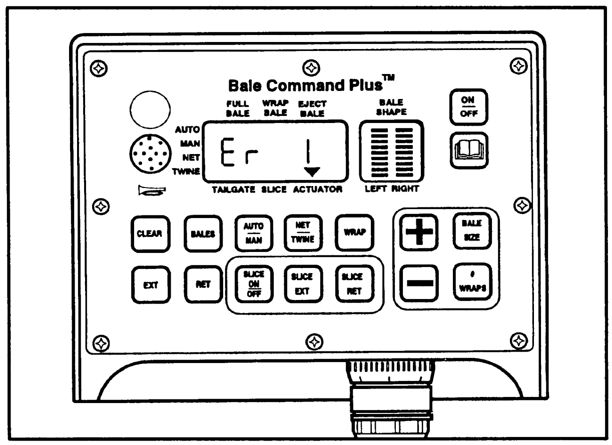


Figure 14-67

Er 3

An Error 3 indicates that the slicing knife actuator stalled or lost power and did not move to the end of its stroke within 5 seconds.

When in the setup/diagnostic mode, the item number corresponding to the test will be flashing at the left of the main display.

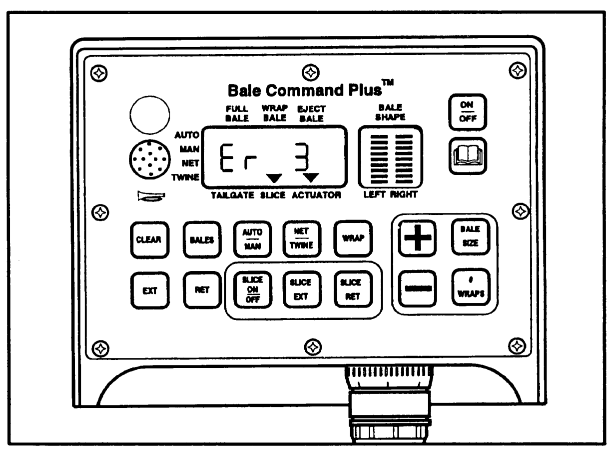


Figure 14-68

DIAGNOSTIC TESTS

The Bale Command Plus system includes the diagnostic tests listed below as part of the setup/diagnostic mode. This allows the sensors to be tested and/or calibrated without the use of special tools.

Refer to the appropriate item in the setup/diagnostic mode, section of the Bale Command Plus operator's manual for additional information on the tests.

When in the setup/diagnostic mode, the item number corresponding to the test will be flashing at the left of the main display.

Setup/ Diagnostic Item	Description
11	Bale size sensor
12	Net actuator sensor adjustment and calibration
13	Left bale density sensor adjustment and calibration
14	Right bale density sensor adjustment and calibration
15	Bale Slice actuator sensor adjustment and calibration
16	Tailgate sensor testing
17	Twine actuator sensor testing
18	Net counter roll sensor testing

NOTE: If the source of a problem with a sensor circuit cannot be located and corrected by using the setup/diagnostic tests and the wiring diagrams, refer to the "Diagnostic Test Procedures" section later in this manual.

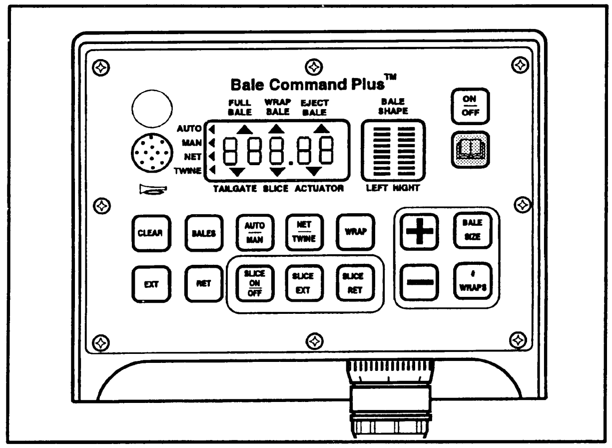


Figure 14-69

Diagnostic Test Procedures

1. Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the full bale size.
2. Press and release the OPEN BOOK key repeatedly to advance to the desired test item number (11 through 18).

   NOTE: There are 22 items available in the setup/diagnostic mode. If you go past the desired item number, continue to press and release the OPEN BOOK key. When the OPEN BOOK key is pressed with item 22 displayed, the item number will return to 1 and start the cycle again.

3. Follow the instructions below for the item to be tested.
4. To advance to the next setup/diagnostic item, press and release the OPEN BOOK symbol.

   OR

   To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

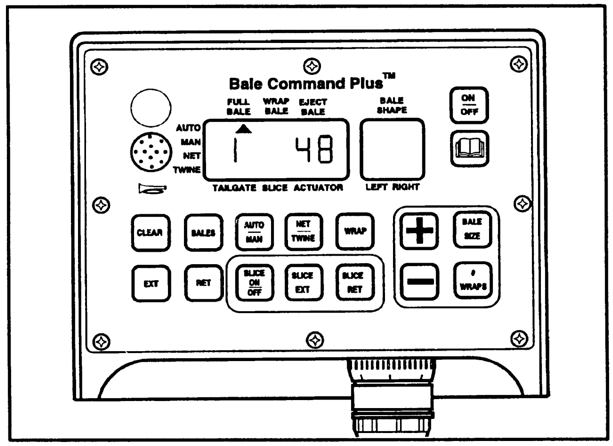


Figure 14-70

Bale Size Sensor Test

After selecting item 11 in the setup/diagnostic mode, the display should read between 33 and 245. If it does not, check the sensor and bracket adjustment as described earlier in this manual.

1. Enter the setup/diagnostic mode. Press and release the OPEN BOOK key repeatedly to advance to item 11.

   The left of the display should read “11” and the FULL BALE indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 30 and 245. If it reads 255, check for a loose or damaged wire harness or connector.

2. Remove the bolt and spacer at 1 connecting the sensor arm, 2, to the take-up arm bracket and rotate the arm. The number on the display should change as the arm is rotated. Move the arm from empty to full and back again.

   IMPORTANT: Do not force the lever as the sensor may be damaged.

   As the lever is moved to the full position, the numbers on the display should increase steadily until they reach a top reading of up to 245. As the lever is moved to the empty position, the numbers on the display should decrease steadily until they reach a low reading of 30 to 60.

   The allowable range for the display is 30 to 245.

   If the numbers decrease at any time while moving toward the full position or if the number goes to 255, the wiring harness should be checked for damage or a loose connection. If the wiring and harness are good, contact your New Holland dealer for assistance.

   If the sensor tests correctly, reinstall the bolt and spacer at 1 connecting the sensor arm, 2, to the take-up arm bracket and adjust the home position of the sensor as follows:

3. Loosen the sensor bracket, 3, mounting bolts and rotate the bracket until the lowest number is displayed. Rotate the bracket again until the display reads 5 to 10 above the lowest number and tighten the bracket mounting hardware.

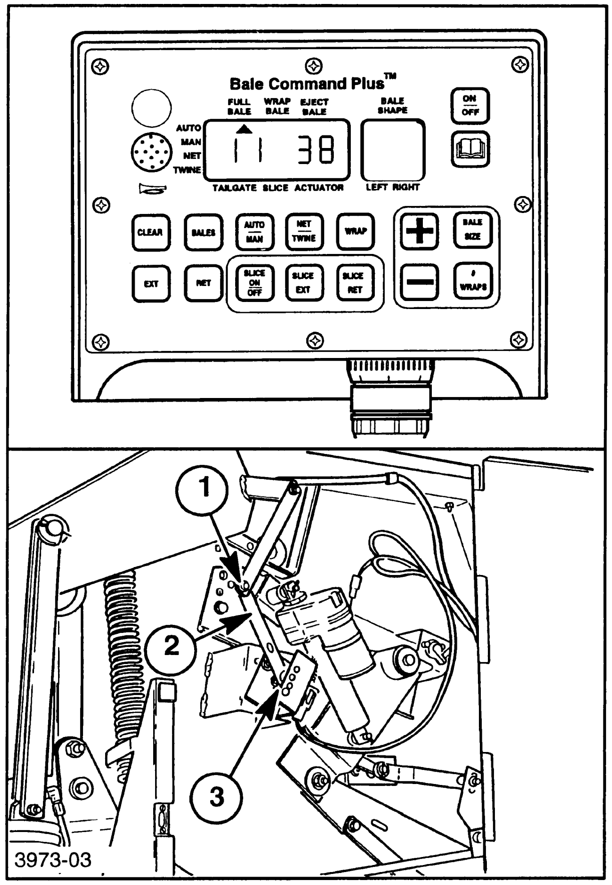


Figure 14-71

4. To advance to the setup/diagnostic item 12, press the OPEN BOOK symbol.

   OR

   To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

   NOTE: If the bale size sensor is replaced, be sure to adjust the empty position as described in step 3.

   IMPORTANT: The controller must also be calibrated using setup item 1 after making and wrapping the first bale in automatic mode.

NET ACTUATOR SENSOR TEST

Setup/diagnostic item 12 is used to check operation of the net actuator position sensor and to calibrate the sensor home position.

To check operation of the sensor:

1. Check to be sure the actuator is fully retracted. If it is not, use the RETract key to move it to the home position.
2. Enter the setup/diagnostic mode. Press and release the OPEN BOOK key repeatedly to advance to item 12.

   The left of the display should read "12," the NET indicator triangle should be ON and the ACTUATOR indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 20 and 30 when the actuator is in the home position. If it reads 255, check for a loose or damaged wire harness or connector.
3. Loosen the sensor mounting bolts and rotate the sensor. The number on the display should change as the sensor is rotated.

   The allowable range for the display is 11 to 245. If the numbers decrease at any time while moving toward the extended position or if the number goes up to 255, the wiring harness should be checked for damage or a loose connection. If the wiring and connections are good, refer to the "Diagnostic Test Procedures" section of this manual.

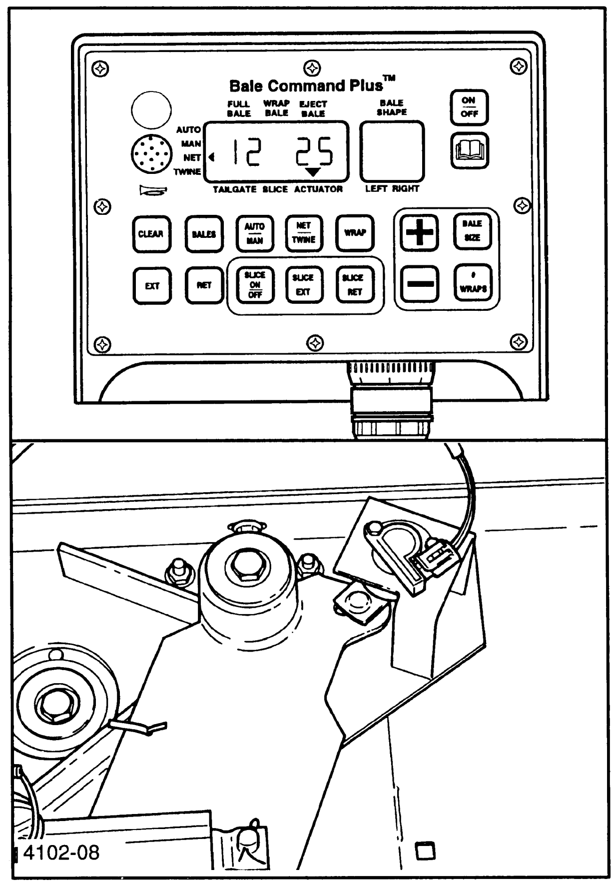


Figure 14-72

4. Rotate the bracket until the number is between 20 and 30, and then tighten the sensor mounting hardware.
5. Calibrate the sensor by pressing and holding the minus (-) key for one second until the alarm activates. The actuator indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed and the alarm will sound three short beeps.

   The precut position is set automatically when calibrating the home position.
6. To clear an incorrect calibration, press and hold the CLEAR key for one second until the alarm activates. The actuator indicator will be on steady during the recalibration. Repeat the calibration procedure.
7. To advance to setup item 12, press the OPEN BOOK symbol.

   OR

   To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

BALE SHAPE SENSOR TEST

1. Check to be sure the sensor arm is at the empty position. If it is not, move it to the empty position. If the linkage is binding, it should be freed before proceeding.
2. Enter the setup/diagnostic mode.
3. Press and release the OPEN BOOK key repeatedly to advance to item 13 for the left sensor or item 14 for the right sensor.

   The left of the display should read "13" or "14," the bottom segment of the respective bar graph should be on and flashing. A number should appear in the right of the display. This number should be between 11 and 245.

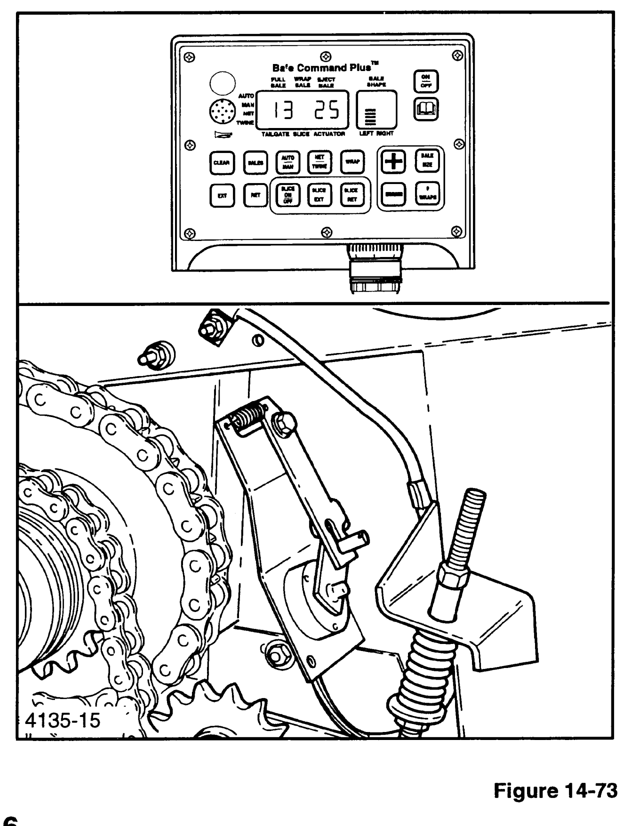


Figure 14-73

4. Loosen the sensor mounting bolts and rotate the sensor. The number on the display should change as the sensor is rotated.

   The allowable range for the display is 11 to 245. If the numbers decrease at any time while moving toward the full position or if the number goes up to 255, the wiring harness should be checked for damage or a loose connection. If the wiring and connections are good, refer to "Test Procedures" later in this section.

5. Rotate the sensor until the number is between 20 and 30, and then tighten the mounting bolts.

6. Calibrate the empty position by pressing and holding the minus (-) key for one second until the alarm activates. The lower five segments of the bar graph will be on steady.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed and the alarm will sound three short beeps.

7. Calibrate the full position by moving the sensor arm to the full position and installing a 1/8″ cotter pin, 1, in the hole in the arm. Allow the cotter pin to rest against the outside of the bale chamber.

8. Press and hold the plus (+) key for one second until the alarm activates. All segments of the bar graph will turn on solid.

   NOTE: The controller will not calibrate if the sensor full position reading is not between 100 and 245. An Er error message will be displayed at the right and the alarm will sound three short beeps.

9. To clear an incorrect calibration, press and hold the CLEAR key for one second until the alarm activates. The bottom segment of the bar graph will flash during the recalibration.

   Repeat the calibration procedure.

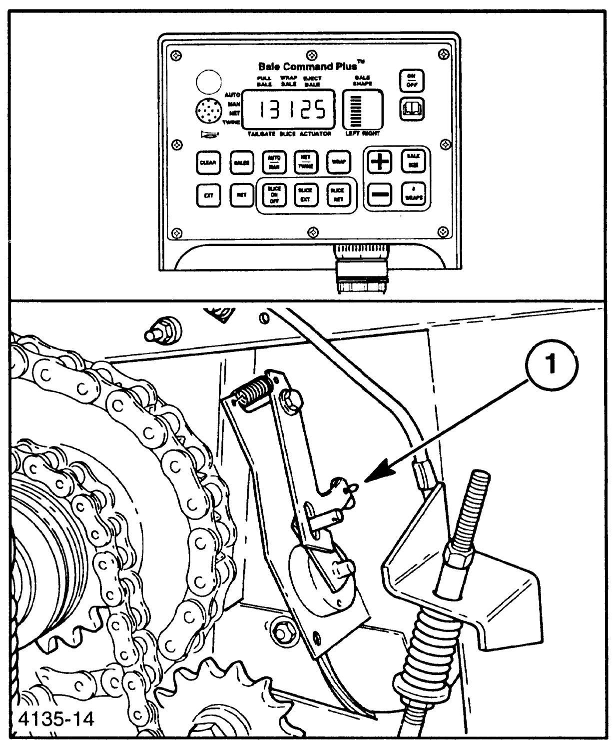


Figure 14-74

10. To advance to the next setup item, press the OPEN BOOK symbol.

    OR

    To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

BALE SLICE ACTUATOR POSITION SENSOR TEST

Setup/diagnostic item 15 is used to check operation of the Bale Slice actuator position sensor.

To check operation of the sensor:

1. Check to be sure the actuator is fully retracted. If it is not, use the SLICE RETract key to move it to the home position.
2. Enter the setup/diagnostic mode.
3. Press and release the OPEN BOOK key repeatedly to advance to item 15.

   The left of the display should read "15," the SLICE indicator triangle should be flashing. A number should appear in the right of the display. This number should be between 11 and 245.

4. Loosen the sensor mounting bolts and rotate the sensor. The number on the display should change as the sensor is rotated.

   The allowable range for the display is 11 to 245. If the numbers decrease at any time while moving toward the slice position or if the number goes to 255, the wiring harness should be checked for damage or a loose connection. If the wiring and connections are good, refer to "Test Procedures" later in this section.

5. Rotate the sensor until the number is between 20 and 30 and then tighten the sensor mounting hardware.

   If the sensor cannot be adjusted so the reading is between 20 and 30, it may be necessary to loosen the two clamps attaching the sensor mount and reposition the mount.

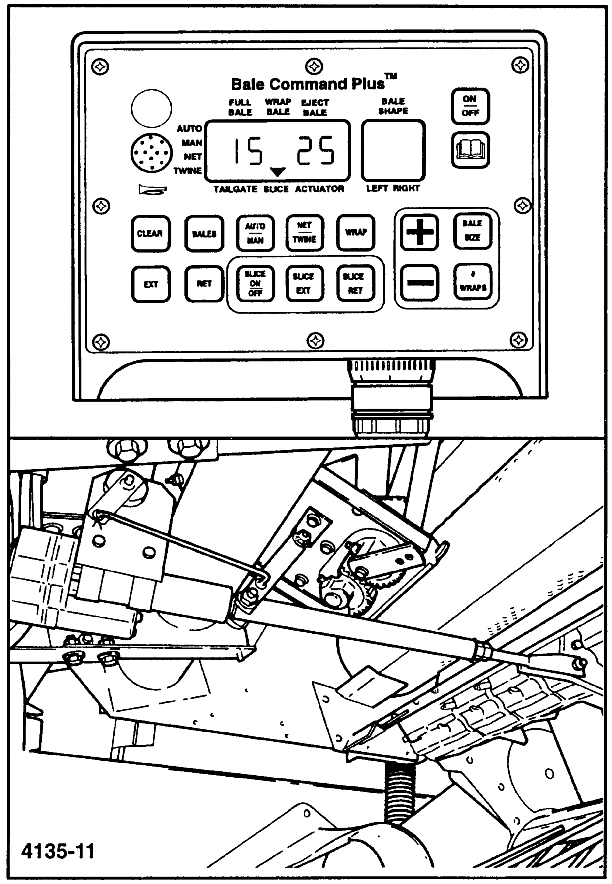


Figure 14-75

6. Calibrate the sensor home position by pressing and holding the - (minus) key for one second until the alarm activates. The SLICE indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor home position reading is not between 11 and 80. An Er error message will be displayed and the alarm will sound three short beeps.

7. Move the actuator to extend the knives to the desired position using the SLICE EXTend key.

8. Press and hold the + (plus) key for one second until the alarm activates. The actuator indicator will be on steady during the calibration.

   NOTE: The controller will not calibrate if the sensor precut position reading is not BETWEEN 100 AND 240. An Er error message will be displayed at the right and the alarm will sound three short beeps.

9. To clear an incorrect calibration, press and hold the CLEAR key for one second until the alarm activates. Repeat the calibration procedure.

10. To advance to setup item 16, press the OPEN BOOK symbol.

    OR

    To exit the setup/diagnostic mode, press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

    NOTE: If the sensor is replaced, be sure to adjust to the home position and then calibrate to the home and slice positions.

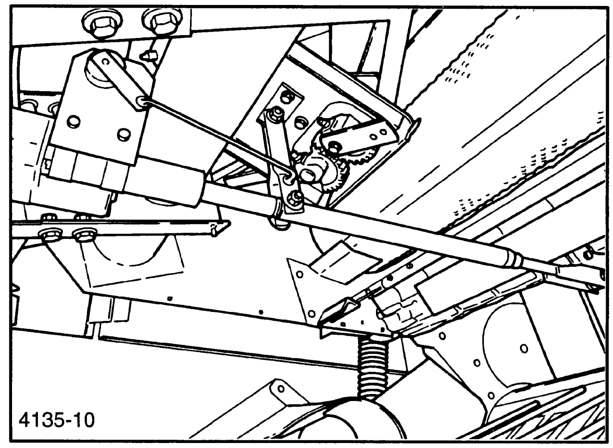


Figure 14-76

TAILGATE, TWINE ACTUATOR, AND NET COUNTER ROLL POSITION SENSOR DIAGNOSTIC TESTS

The twine actuator, tailgate, and net counter roll position sensors are solid-state magnetically operated switches that change the return signal to the controller depending on the position of the sensor and magnet.

Setup/diagnostic items 16, 17, and 18 are used to check operation of the sensors.

IMPORTANT: Before testing the sensors, check to be sure that they are adjusted correctly as described in the "Adjustments" section earlier in this manual.

1. Enter the setup/diagnostic mode.
2. Use the + (plus) or - (minus) key to change the bale size displayed to the measured size.
3. Press and release the OPEN BOOK key repeatedly to advance to item 16 to test the tailgate sensor, item 17 to test the twine actuator, or item 18 to test the net counter roll sensor.

   The left of the display should read 16, 17, or 18, the TAILGATE (or ACTUATOR or WRAP BALE) indicator triangle should be on. The indicator should be on steady and the display read "Lo" when the sensor is over a magnet. If the sensor being tested is not over a magnet, the indicator should be flashing and the display read "Hi."

   Move a magnet away from the sensor and back again. The operator's panel should "beep" at each change. The sensor's pointer should be on steady when the magnet is under the sensor. The pointer should be flashing when the magnet is away from the sensor. The display will read "Lo" when the magnet is under the sensor. The display will read "Hi" when the magnet is away from the sensor. The EXTend and RETract keys on the operator's panel can be used to move the twine actuator sensor away from the magnet. A piece of steel 1/16″ to 1/8″ (2 mm - 3 mm) can be placed between the tailgate sensor and magnet to block the magnetic effect on the sensor.

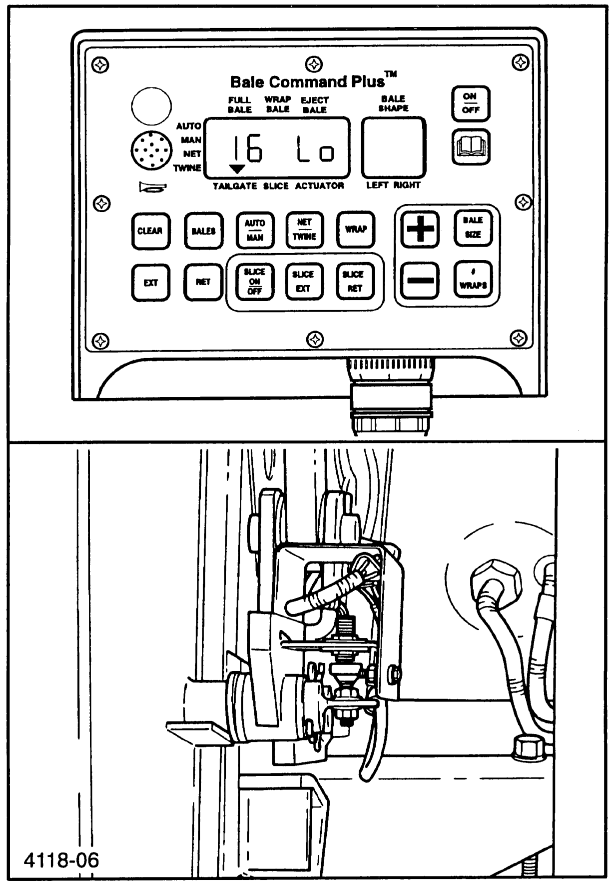


Figure 14-77

If a sensor does not respond as previously described, switch it with one of the other sensors that does respond properly. If the "new" sensor works correctly, the original sensor is defective and should be replaced. If the new sensor does not solve the problem, switch the magnet under the sensor with one that is known to be working correctly. If the new magnet operates the sensor correctly, reinstall the original sensor and retest it. If both sensors are good, replace the original magnet. If the new sensor and magnet do not locate the source of the problem, refer to the "Test Procedures" section below.

TEST PROCEDURES

Net and Twine Actuator Test Procedures

Test I

Select the wrapper type (twine or net) to be tested. The indicator triangle for that wrapper should be on. Press the EXTend key. If the actuator extends, the extend circuit is good. With the actuator extended, press the RETract key. If the actuator retracts, both the retract circuit and actuator are good. Change the selected type wrap to the opposite type (i.e., net to twine) and repeat the test.

Test II

If one actuator works and the other does not, switch them and repeat the test. If an actuator does not work for either type of wrap but the other actuator works for both types, replace the actuator. If neither actuator works for one type of wrap but both work for the other type of wrap, check the wiring to the position that does not work.

Test III

If either the EXTend or RETract key fails to move an actuator, make a jumper wire to connect the actuator to a 12-volt power source. If the actuator moves with the jumper wire, the actuator is good. Check for a damaged wire or loose or corroded connector between the operator's panel and controller and between the controller and actuator. If an actuator does not move with the jumper, replace the actuator.

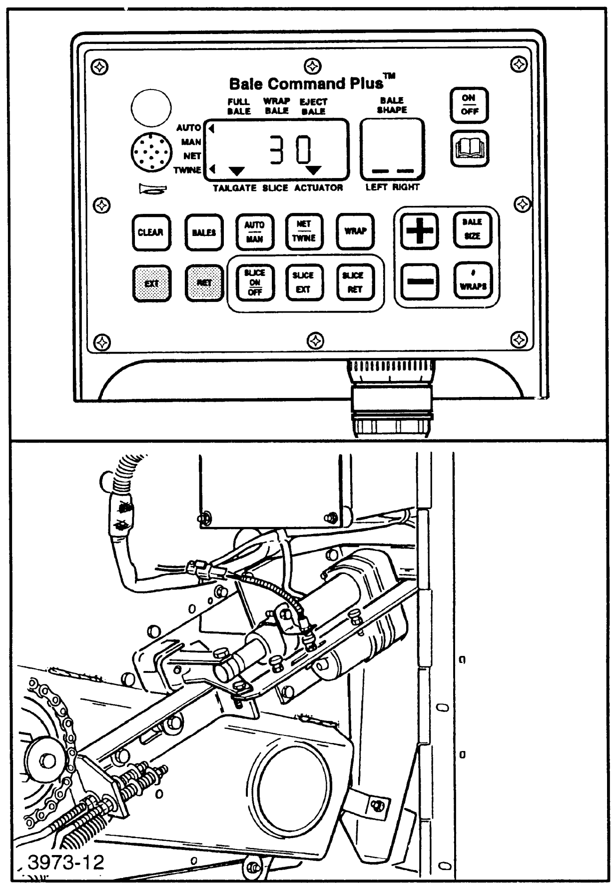


Figure 14-78

Test IV

If the Extend or Retract keys do not operate an actuator in either direction, use a test light or volt/ohmmeter to check for 12 volts at the connector at the actuator when the keys are pressed for each direction. If there are 12 volts at the connector, replace the actuator.

If there are not 12 volts at the harness connector plug, use special tool FNH00550 leads, 1, to connect a test light or volt/ohmmeter between pins 12 and 14 for the twine actuator or between pins 10 and 16 for the net actuator at the wire harness connector at the controller. Refer to the wiring diagram. When a key is pressed, there should be 12 volts at the connector. If there are 12 volts at the controller, check the wiring between the controller and the actuator.

If there are not 12 volts at the controller, check the wiring between the controller and the operator's panel.

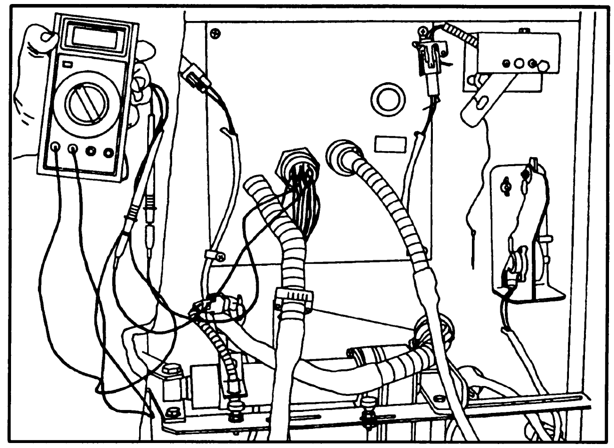


Figure 14-79

If the wiring is good, check the keys on the operator's panel as follows:

Enter the setup/diagnostic mode by pressing and holding the OPEN BOOK key. The display should indicate "1" and the full bale size. Press and release the OPEN BOOK key repeatedly to advance to item 19. Press the OPEN BOOK key one more time to advance to item 20 (20 will not be displayed) to test the display and keys.

The display should cycle through all elements and then display 5 dashes. Press the EXTend key and the display should read "2." Press the RETract key and the display should read "4." If it does not, replace the operator's panel.

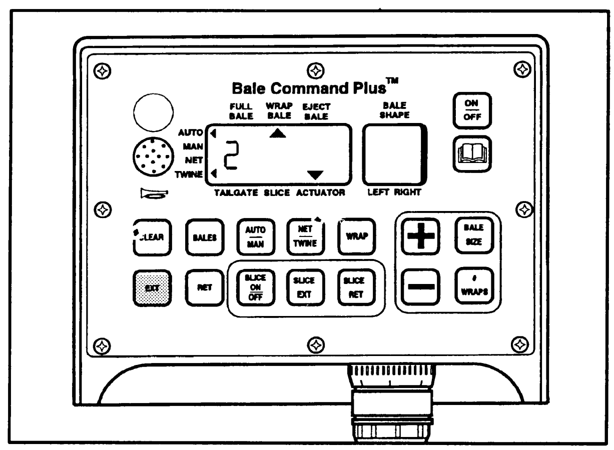


Figure 14-80

If the wiring is good and the keys are good, replace the controller.

Press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

Bale Slice Actuator Test Procedure

1. With the Bale Slice turned on, press the SLICE EXTend key. If the actuator extends, the extend circuit is good. With the actuator extended, press the SLICE RETract key. If the actuator retracts, both the retract circuit and actuator are good.

2. If either the SLICE EXTend or SLICE RETract key fails to move the actuator, make a jumper wire to connect the actuator to a 12-volt power source. If the actuator moves with the jumper wire, the actuator is good. Check for a damaged wire or loose or corroded connector between the operator's panel and controller or between the controller and actuator. If the wiring is good, refer to Step 4.

3. If the actuator does not work, remove it and connect it to the net or twine actuator harness connector after making sure the net or twine actuator works. Select the appropriate wrapper and test the actuator using the EXTend and RETract keys. If the Bale Slice actuator does not work when connected to the wrapper actuator harness, replace the actuator. If the Bale Slice actuator works when connected to the wrapper actuator harness, check the wiring to the Bale Slice actuator. Refer to Figure 4.

4. If the wiring is good, check for 12 volts between pins D and H and between pins E and J of the slice harness connector plug on the controller. If there are 12 volts at the controller pins, check the key pad SLICE EXTend and SLICE RETract keys following the instructions for the wrapper actuators. When in setup/diagnostic item 20, pressing the SLICE EXTend key should display 8 and pressing the SLICE RETract key should display 10. If it does not, replace the operator's panel.

   If the wiring is good and the keys are good, replace the controller.

   Press and hold the OPEN BOOK symbol for two seconds. The alarm will sound to indicate that the controller has been taken out of the setup/diagnostic mode and returned to normal operation.

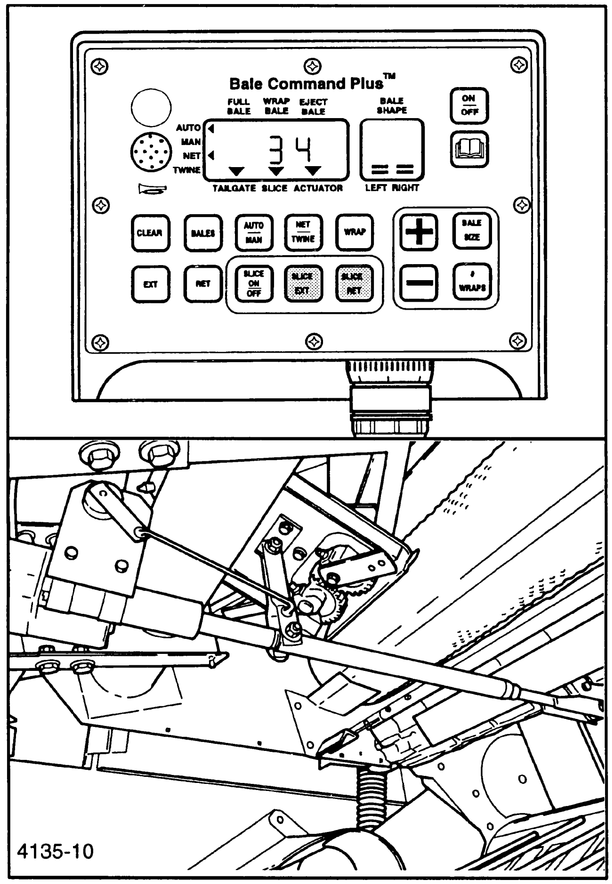


Figure 14-81

BALE SIZE SENSOR TEST PROCEDURES

If the self-diagnostic test does not locate a problem with the bale size sensor, use the following procedures to locate the problem.

Test I

1. Disconnect the sensor, 1, from the wiring harness, 2.

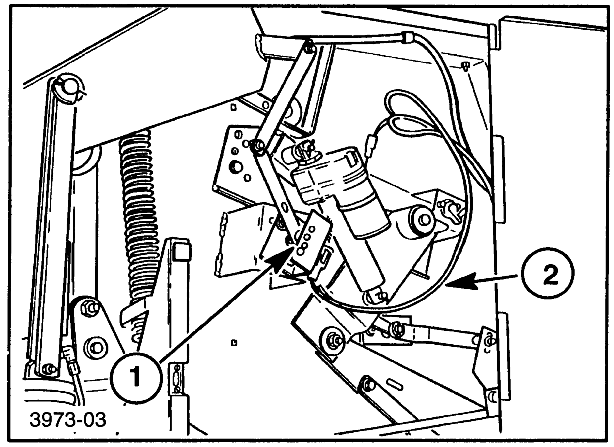


Figure 14-82

2. Connect an ohmmeter between the green and black wires of the sensor. There should be a reading of 500 ohms to 5000 ohms as the lever is moved between empty and full.
3. If the ohmmeter reading is out of the range, replace the sensor.
4. If the ohmmeter reading is within the range, check the wiring harness between the sensor and controller for a broken wire, shorted wire or damaged connecter and repair as required.
5. If the wire harness is good, go to Test II.

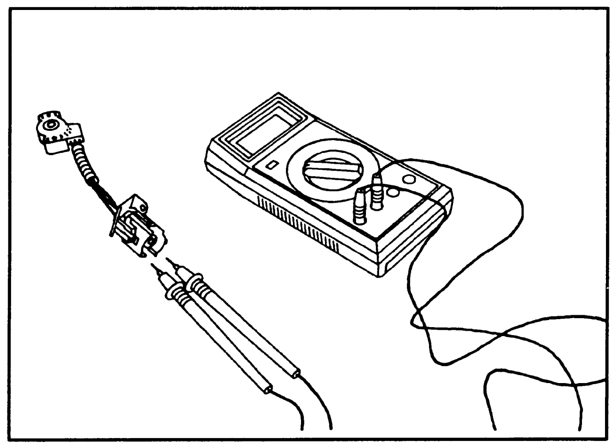


Figure 14-83

Test II

Disconnect the sensor from the harness. Check the voltage at the harness connector pins. Refer to sensor plug A on the wiring diagram.

The readings should be as follows:

BETWEEN PINS VOLTS (plus or minus 0.5 volt)

A - B = 5

A - C = 0

B - C = 5

If the voltages are correct, replace the sensor.

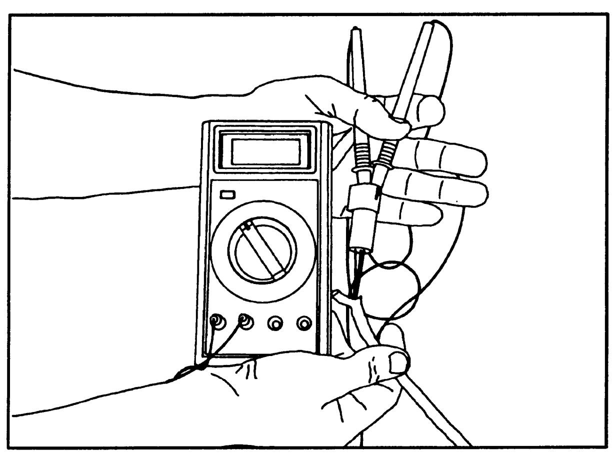


Figure 14-84

If the voltages are not correct, use the special leads (tool #FNH00550) to check the connector at the controller.

With the sensor disconnected, the readings should be as follows:

BETWEEN PINS	VOLTS (plus or minus 0.5 volt)
9 - 15	5
9 - 3	0
15 - 3	5

If the voltages are correct, check the wires between the controller and sensor. If the voltages are incorrect, replace the controller.

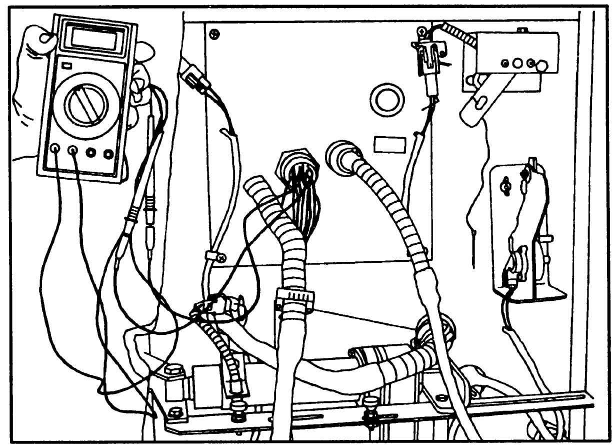


Figure 14-85

BALE SHAPE, NET ACTUATOR, AND SLICE ACTUATOR POSITION SENSOR TEST PROCEDURES

If the self-diagnostic test does not locate a problem with the sensor, use the following procedures to locate the problem.

Test I

1. Disconnect the wiring harness from the sensor, 1.

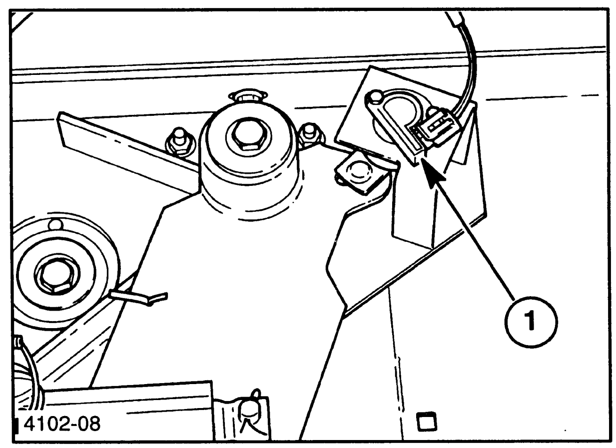


Figure 14-86

2. Connect an ohmmeter between pins in the sensor plug. Deutsche-type connector pins, 1, New Holland #900364, can be used to make it easier to connect the ohmmeter to the sensor.

Pins	Ohmmeter Reading
A - B	Between 5000 and 8000 ohms
B - C	*Between 1000 and 3500 ohms
A - C	*Between 1000 and 8000 ohms

*When the ohmmeter is connected between pins B and C or between A and C, the reading should vary as the center of the sensor is rotated.

3. If the ohmmeter reading is out of the range, replace the sensor.

4. If the ohmmeter reading is within the range, check the wiring harness between the sensor and controller for a broken wire, shorted wire or damaged connecter and repair as required. If the wire harness is good, follow Test II to check the sensor circuit at the controller.

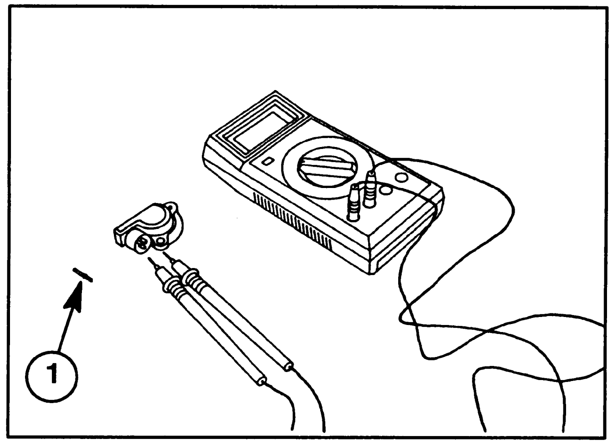


Figure 14-87

Test II

Disconnect the sensor from the harness. Check the voltage at the harness connector pins. Refer to the wiring diagram.

The readings should be as follows:

BETWEEN PINS VOLTS (plus or minus 0.5 volt)

A - B = 5

A - C = 5

B - C = 0

If the voltages are correct, replace the sensor.

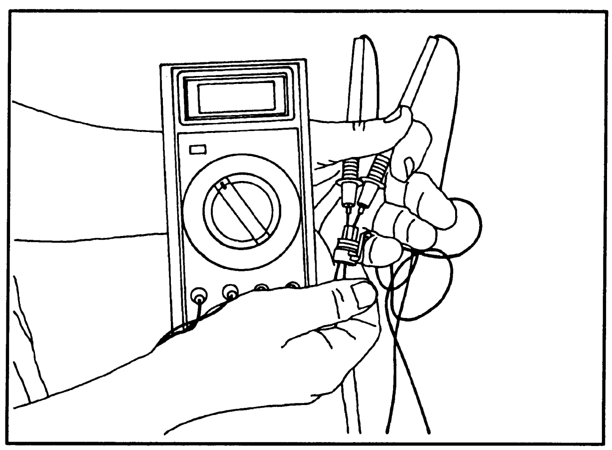


Figure 14-88

If the voltages are not correct, use the special leads (tool #FNH00550) to check the connector at the controller.

With the sensor disconnected, the readings should be as follows.

BETWEEN PINS VOLTS (plus or minus 0.5 volt)

LEFT BALE SHAPE

Pins	Volts
9-15	5
9-4	5
15-4	0

NET ACTUATOR

Pins	Volts
9-15	5
9-6	5
15-6	0

RIGHT BALE SHAPE

Pins	Volts
9-15	5
9-5	5
15-5	0

SLICE ACTUATOR

Pins	Volts
B-F	5
B-A	5
F-A	0

If the voltages are correct, check the wires between the controller and sensor. If the voltages are incorrect, replace the controller.

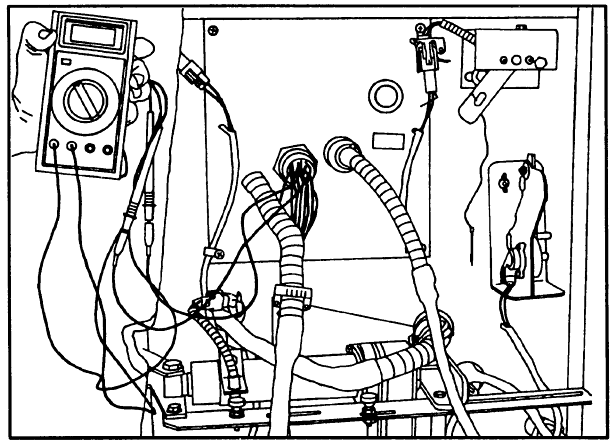


Figure 14-89

TWINE ACTUATOR POSITION, TAIL-GATE AND COUNTER ROLL SENSOR TEST

If the self-diagnostics test did not locate the source of a problem with a position sensor circuit, use the following procedure to locate the problem.

Test I

1. Check the magnet to sensor adjustment, adjust if required and recheck the display. With a magnet near the sensor, the display pointer should be solid; with the magnet away from the sensor, the pointer should flash. If still incorrect, proceed to step 2.
2. Disconnect the sensor from the wiring harness. Refer to the wiring diagram, Figure 14-59.

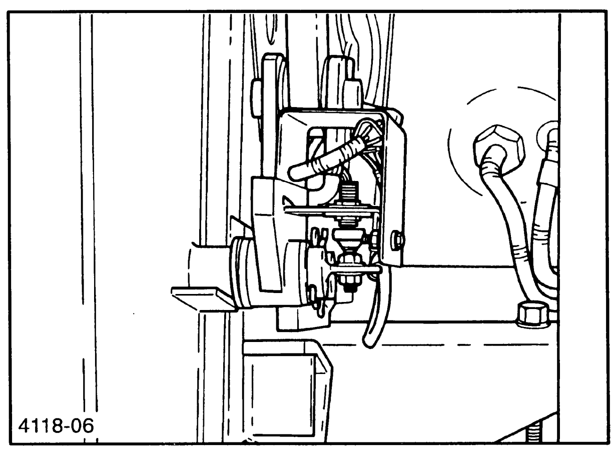


Figure 14-90

Connect a jumper between pin A and the signal wire pin C. If the alarm beeps and the indicator for that circuit stops flashing, go to step 3.

If the alarm does not beep and the indicator continues to flash, refer to the sensor circuit test.

3. Reconnect the wire harness to the sensor and check the sensor operation with another magnet that was near a sensor that is working correctly. If the sensor now operates correctly, replace the original magnet. If the sensor does not operate correctly, replace the original sensor.

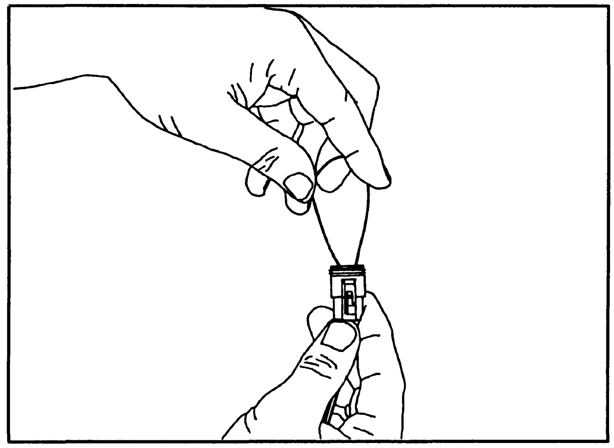


Figure 14-91

Test II

Disconnect the sensor from the harness. Check the voltage at the harness connector pins. Refer to the wiring diagram, Figure 14 - 59.

The readings should be as follows:

BETWEEN PINS VOLTS (plus or minus 0.5 volt)

A - B = 5

A - C = 5

B - C = 10

If the voltages are correct, replace the sensor.

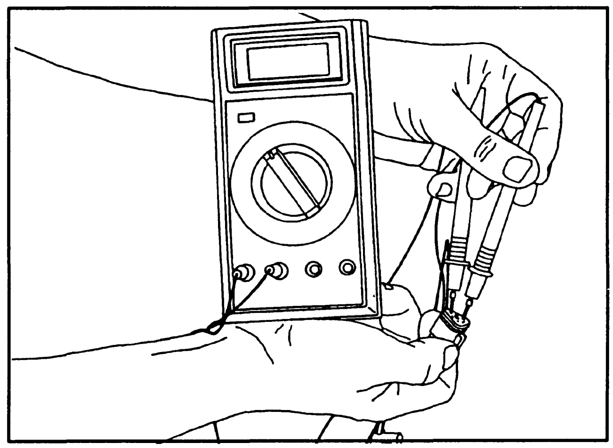


Figure 14-92

If the voltages are not correct, use the special leads (tool #FNH00550) to check the connector at the controller.

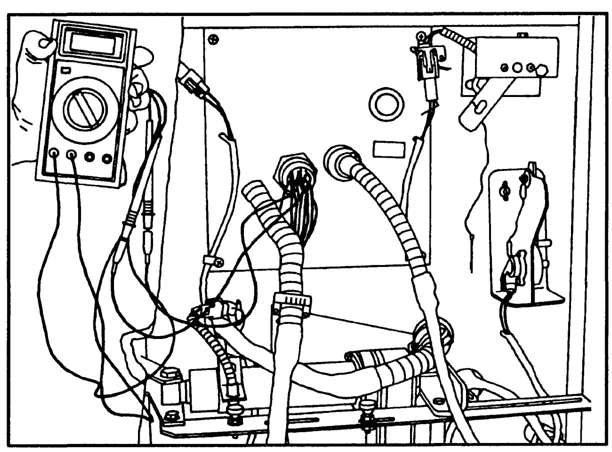


Figure 14-93

With the sensor disconnected, the readings should be as follows:

BETWEEN PINS VOLTS (plus or minus 0.5 volt)

TAILGATE SENSOR		TWINE ACTUATOR SENSOR	
Pins	Volts	Pins	Volts
9-15	5	9-15	5
9-11	5	9-17	5
15-11	10	15-17	10

COUNTER ROLL SENSOR

Pins	Volts
9-15	5
9-13	5
15-13	10

If the voltages are correct, check the wires between the controller and sensor. If the voltages are incorrect, replace the controller.

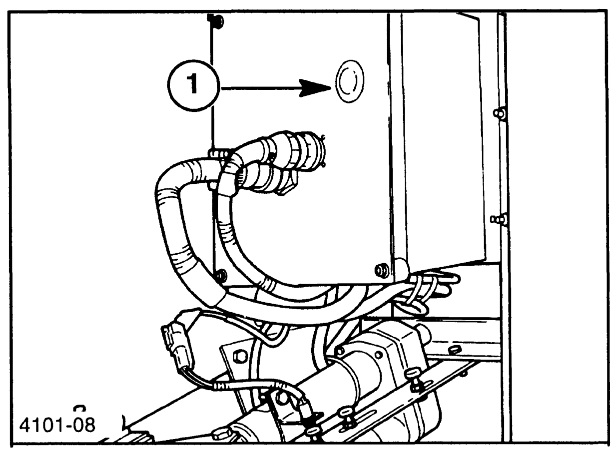


Figure 14-94

STATUS LIGHT TEST

Remove the rubber plug, 1, from the controller. With the Bale Command Plus system on, the green LED status light at 1 should be flashing. If not, there is a problem either in the controller or the wiring between the controller and the tractor or operator's panel.

Refer to the wiring diagram, Figure 14–59.

Check the Data 1, Data 2, and clock wires for damage or a loose connection. Repair as required.

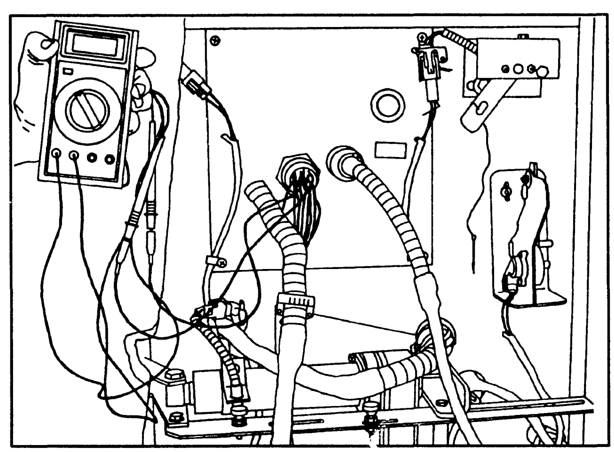


Figure 14-95

Use the special leads (tool #FNH00550) to check the connector at the controller. There should be at least 11 volts between pins 8 and 14.

If there is not, check the wires to the operator's panel and tractor. If the voltage is correct, replace the controller.

BALE COMMAND PLUS ELECTRICAL SYSTEM

PROBLEM	POSSIBLE CAUSE	CORRECTION
Display will not turn on	Harness not connected to operator's panel, controller or power source.	Be sure all harness connections are properly secured.
	Power supply wires reversed.	Reverse the wires. The red wire must be connected to the positive post.
	Low voltage.	Check battery and charging system on tractor. Must have 11 volts available.
	Defective operator's panel or controller.	Contact your New Holland dealer.
	Failed or tripped circuit breaker.	Replace or reset the breaker.
	Damaged wire harness.	Repair or replace the harness.
Error and TAILGATE indicator flashing. The WRAP BALE and ACTUATOR indicators will also be flashing if the Error is displayed during a wrap cycle.	Tailgate is open or unlatched.	Close and latch the tailgate.
	Tailgate magnet and sensor not adjusted correctly.	Adjust the magnet and sensor.
	Defective magnet or sensor.	Replace the magnet or sensor.
	Damaged wire harness or connector.	Repair the harness. Clean and check the connector.
Error and FULL BALE indicator.	Damaged wire harness or connector.	Repair.
	Sensor disconnected.	Connect the sensor.
	Defective sensor.	Replace.
Error and ACTUATOR indicator on at startup	Actuator not in the home position.	Use the RETract key to return actuator to the home position.
OR	Sensor not adjusted correctly.	Adjust sensor.
Error and ACTUATOR indicator flashing while baling.	Defective sensor or twine sensor magnet.	Replace.
	Damaged wire harness or connector.	Repair.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Error and WRAP BALE indicator flashing, but the actuator did not move.	Low voltage	Check the power supply voltage.
	Loose connection.	Check that connections are clean and connected properly.
	Damaged harness or connector.	Repair.
	Defective actuator.	Replace.
	Defective controller.	Replace.
	Net started to be pulled from the roll before the bale was full size due to: Net was not cut properly leaving a long tail OR the duckbill was not in the home position due to damaged linkage.	Check the mechanical knife operating linkage and knife sharpness.
Error and the WRAP BALE and ACTUATOR indicators are flashing. The net or twine actuator started to move but did not complete the cycle.	The wrap cycle was interrupted by the operator pressing the EXTend, RETract or AUTO/MAN key OR by the tailgate opening and closing.	Use the RETract key to return the actuator to the home position and restart the wrap cycle using the WRAP key.
	Poor or loose connection.	Check that connections are clean and properly connected.
	Damaged wire harness.	Repair.
	Defective actuator.	Replace.
	Defective controller.	Replace.
Error and the WRAP BALE indicator flashing - The net actuator stopped at the precut position. The bale is not wrapped.	The controller did not receive a signal from the counter roll sensor because the net did not start to feed.	The Bale Command Plus system is working correctly. Check for a mechanical problem or empty net roll.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Error and WRAP BALE indicator is flashing. The net actuator stopped at the precut position. The bale is wrapped. OR The WRAP BALE indicator does not turn on when the net starts.	The controller did not receive a signal from the counter roll sensor because of: a. The net not contacting the counter roll properly. b. Incorrectly adjusted sensor. c. Damaged wire or connector. d. Defective sensor or magnet.	 a. Check the brake linkage and net routing. b. Adjust the sensor. c. Repair. d. Replace.
The actuator extends but does not retract.	The EXTend, RETract or AUTO/MAN key was pressed during the wrap cycle. Damaged wire harness or connector. Defective actuator. Defective controller.	Return the actuator to the home position and restart the wrap cycle with the WRAP key. Repair or replace the harness. Replace the actuator. Replace the actuator.
The bale size on the display does not match the size bale made,	The controller and bale size sensor are not calibrated to each other.	Enter the setup/diagnostic mode and recalibrate.
The display does not return to 30 (75 on metric balers) when a bale is ejected.	Bale size sensor not adjusted. Defective sensor. Sensor linkage damaged or disconnected.	Adjust the sensor. Replace the sensor. Repair or reconnect the linkage.
The bale count is not accurate.	The tailgate sensor is not sending a signal to the controller due to: a. Magnet and sensor are not adjusted correctly. b. Damaged wire harness or loose connection. c. Defective magnet or sensor.	 a. Adjust the sensor and magnet. b. Repair or replace the harness. Check the connector. c. Replace the magnet or sensor.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Actuator indicator flashes when the twine sensor is over a magnet. OR The actuator indicator stays on steady when the sensor is away from the magnet.	Incorrect adjustment of magnet and sensor. Defective magnet or sensor. Damaged wire harness or loose connection.	Adjust the magnet and sensor. Replace the magnet or sensor. Repair or replace the harness. Check the connector.
The net or twine is not wrapped on the bale when the cycle is completed.	Out of twine or net. Mechanical interference with the twine or net or a mechanical problem with the wrapping system.	Install new balls of twine or a new roll of net. Refer to the baler operator's manual.
Er 1	The actuator stalled for more than 5 seconds.	Remove the obstruction, retract the actuator, and restart the wrap cycle.
The bale shape bar graphs do not operate properly.	Sensors not calibrated correctly for empty and full positions. Sensor linkage frozen. Defective sensor.	Calibrate the sensors. Refer to the setup/diagnostic mode section. Free and lubricate the linkage. Replace the sensor.
The bale shape alarm does not work.	The alarm is not turned ON. The alarm threshold is set too high.	Turn the alarm on. Refer to item 4 in the setup/diagnostic mode. Reset the alarm threshold. Refer to item 5 in the setup/diagnostic mode.
The bale shape alarms too easily.	Alarm threshold set too low.	Reset the alarm threshold. Refer to item 5 in the setup/diagnostic mode.
The BALE SHAPE bar graphs respond too slowly.	The sensitivity is set too low.	Set the sensitivity higher. Refer to Item 18 in the setup/diagnostic mode.
The BALE SHAPE bar graphs respond too fast and are constantly changing.	The sensitivity is set too high.	Set the sensitivity lower. Refer to Item 18 in the setup/diagnostic mode.

BALE SLICE TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
The actuator will not extend automatically.	The Bale Slice system is not turned on.	Turn the Bale Slice system on.
	The insert knife size is set incorrectly.	Enter the setup/diagnostic mode and reset the insert size.
	Damaged wire harness.	Repair or replace the harness.
	Corroded or loose connector.	Clean and check the connectors.
	Defective actuator.	Replace the actuator.
	Obstruction in the knife path.	Remove the obstruction.
	Defective controller.	Replace the controller.
The actuator extends but will not retract automatically.	Defective actuator.	Replace the actuator.
	Damaged wire harness.	Repair or replace the harness.
	Loose or corroded connector.	Clean and check the connectors.
	Defective controller.	Replace the controller.
Error message - the SLICE and WRAP BALE indicators are also flashing.	Bale slice system turned off after start of a wrap cycle, but before the knives are completely retracted.	Turn the Bale Slice on. Use the SLICE RETract key to retract the knives. Restart the wrap cycle.
Error message - the SLICE and ACTUATOR indicators are flashing.	SLICE EXTend or SLICE RETract key pressed while the actuator was moving.	Press CLEAR to clear the alarm. The SLICE EXT and SLICE RET keys will cause the actuator to pause only. It will restart when the keys are released.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Er 3	The Bale Slice actuator stalled for more than 5 seconds.	Remove the obstruction.
The actuator does not start to insert the knives at the correct diameter.	The controller is programmed for the wrong size.	Reset the knife insert size. Refer to item 3 in the setup/diagnostic mode.
The knives are not moved completely to the cut or retracted position.	The actuator position sensor is not calibrated properly.	Recalibrate the sensor. Refer to item 15 in the setup/diagnostic mode.

LABOR GUIDE

	HOURS
Actuator, net, R & R	0.30
Actuator, Bale Slice	0.50
Actuator, twine, R & R	0.50
Bale size sensor,	
R & R	1.00
Adjust	0.25
Connector, wire harness, R & R	0.50
Controller, R & R	0.50
Counter roll magnet, R & R	1.50
Counter roll sensor, R & R	0.50
Light, operator's panel, R & R	0.30
Operator's panel, R & R	0.20
Relay, R & R	0.50
Sensor, actuator position, bale shape,	
R & R	0.75
Adjust	0.25
Sensor, bale size,	
R & R	1.00
Adjust	0.25
Sensor, counter roll, tailgate,	
R & R	0.50
Adjust	0.25
Sensor, tailgate latch,	
R & R	0.30
Adjust	0.20
Wire harness, all, repair	1.00
Wire harness,	
Tractor, R & R	0.50
Baler, R & R	1.00
Bale Slice, R & R	0.50

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